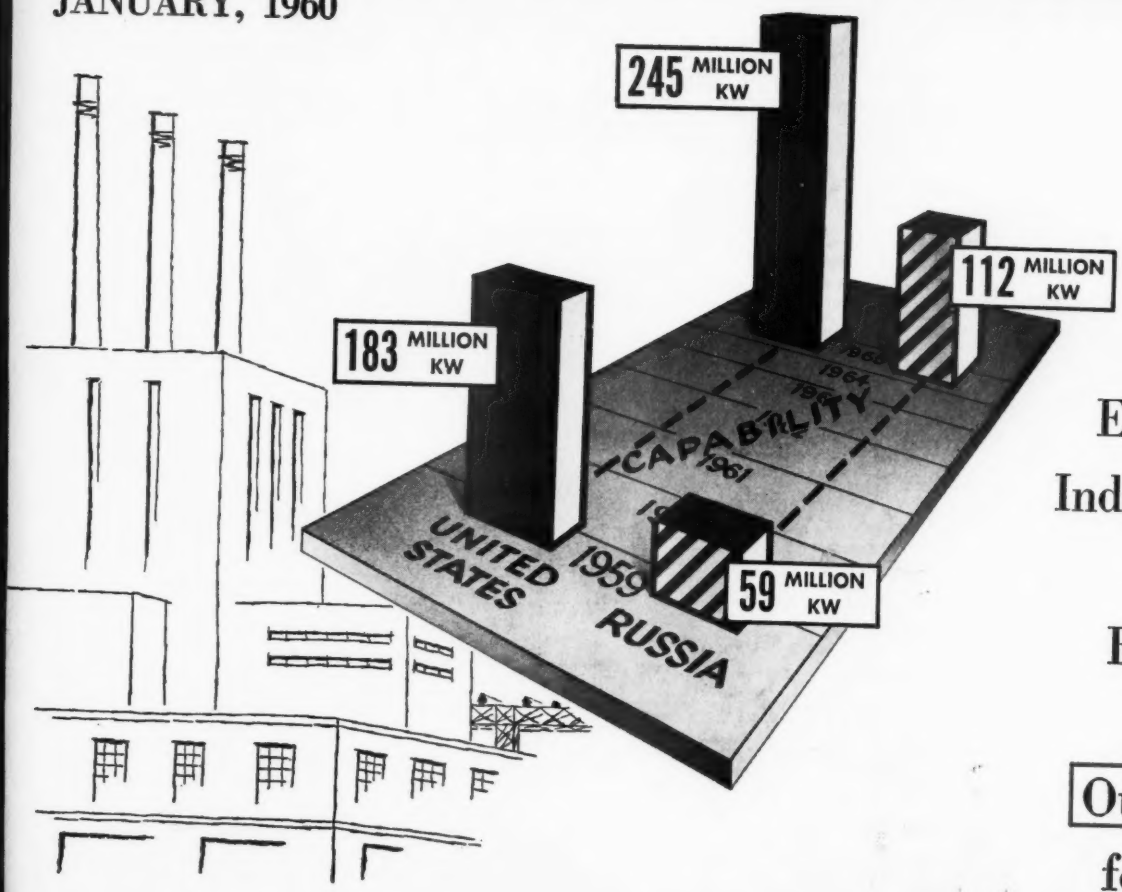
EEI BULLETIN

JANUARY, 1960



Electric Industry's 1959 Record and Outlook for the Future

PUBLISHED BY EDISON ELECTRIC INSTITUTE

ELECTRIC UTILITY INDUSTRY Statistics IN THE UNITED STATES

for OCTOBER 1959

Current Statistical Data Covering 100 Percent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)—October, 1959

	1959	1958	%
SOURCE AND DISPOSAL OF ENERGY			
NET GENERATION* (Kwhr in Thousands)			
By Fuel Burning Plants	47,528,828	44,543,218	+ 6.7
By Water Power Plants	11,503,230	10,813,649	+ 6.4
Total Generation	**59,032,058**	**55,356,867**	**+ 6.6**
Add—Net Imports over International Boundaries	231,491	268,863	−13.9
Less—Company Use	160,731	159,553	+ 0.7
Less—Energy Used by Producer	1,400,620	1,400,053	+ 0.0
Net Energy for Distribution	**57,702,198**	**54,066,124**	**+ 6.7**
Lost and Unaccounted for	5,641,423	5,728,383	− 1.5
Sales to Ultimate Customers	**52,060,775**	**48,337,741**	**+ 7.7**
CLASSIFICATION OF SALES			
NUMBER OF CUSTOMERS—As of October 31st			
Residential or Domestic	48,742,373	47,557,772	+ 2.5
Rural (Distinct Rural Rates)	1,663,998	1,668,241	− 0.3
Commercial or Industrial:			
Small Light and Power	6,378,667	6,283,057	+ 1.5
Large Light and Power	321,811	316,804	+ 1.6
Other Customers	194,175	188,191	+ 3.2
Total Ultimate Customers	**57,301,024**	**56,014,065**	**+ 2.3**
KILOWATT-HOUR SALES—During Month of October (Kwhr in Thousands)			
Residential or Domestic	13,916,430	12,462,020	+11.7
Rural (Distinct Rural Rates)	977,911	900,335	+ 8.6
Commercial or Industrial:			
Small Light and Power	9,809,674	8,699,149	+12.8
Large Light and Power	25,191,413	24,332,974	+ 3.5
Street and Highway Lighting	524,052	493,278	+ 6.2
Other Public Authorities	1,210,437	1,096,260	+10.4
Railroads and Railways	379,759	300,523	+26.4**
Interdepartmental	51,099	53,202	− 4.0
Total to Ultimate Customers	**52,060,775**	**48,337,741**	**+ 7.7**
Revenue from Ultimate Customers (Thousands)	**$891,122**	**$821,511**	**+ 8.5**
RESIDENTIAL OR DOMESTIC SERVICE			
AVERAGE CUSTOMER DATA—for 12 months ended October 31, 1959			
Kilowatt-hours per Customer	3,540	3,347	+ 5.8
Average Annual Bill	$88.85	$84.68	+ 4.9
Revenue per Kilowatt-hour	2.51¢	2.53¢	− 0.8

* By courtesy of the Federal Power Commission.

** Due to increased kwhr sales to New York City Transit Authority.

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The EDISON ELECTRIC INSTITUTE BULLETIN is published monthly, except bi-monthly in July and August, by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of private electric utilities in North, Central and South America and contiguous islands in the Western Hemisphere.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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CONVENTIONS AND MEETINGS

1960

JANUARY

20 PIP Workshop Conference Committee, Sheraton-Charles Hotel, New Orleans, La.

20-22 EEI-AGA Taxation Accounting Committees, Sheraton-Jefferson Hotel, St. Louis, Mo.

21-22 EEI Industrial Relations Committee Jointly sponsored with the Southwestern Personnel Group, Dallas Sheraton Hotel, Dallas, Texas

21-22 EEI Transmission & Distribution Committee, Hotel Soreno, St. Petersburg, Fla.

21-22 PEA Systems Operation Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

22 Oklahoma Utilities Association Accounting Section Meeting, Tulsa, Okla.

25-27 EEI-AGA Taxation Accounting Committees, Sheraton-Jefferson Hotel, St. Louis, Mo.

28-29 PEA Transmission & Distribution Committee Winter Meeting, Pittsburgh-Hilton Hotel, Pittsburgh, Pa.

31-Feb. 5 AIEE Winter General Meeting, Statler-Hilton and Sheraton-Atlantic Hotels, New York, N. Y.

FEBRUARY

1- 2 EEI Commercial Lighting Committee, Terrace Hilton Hotel, Cincinnati, Ohio

1- 3 EEI Prime Movers Committee, Sheraton-Cleveland Hotel, Cleveland, Ohio

1- 4 Fourth National Industrial Electrification Heating Conference, Netherland Hilton Hotel, Cincinnati, Ohio

1- 5 ASTM Committee Week, Hotel Sherman, Chicago, Ill.

3- 4 EEI Street & Highway Lighting Committee, Birmingham, Ala.

4- 5 EEI Industrial Power & Heating Group, Netherland Hilton Hotel, Cincinnati, Ohio

8- 9 Missouri Valley Electric Association Industrial & Commercial Sales Conference, President Hotel, Kansas City, Mo.

15-16 EEI-AGA Accounting Conference Final Working Meeting, Sheraton-Cadillac Hotel, Detroit, Mich.

15-16 EEI Electrical System & Equipment Committee, Bellevue-Stratford Hotel, Philadelphia, Pa.

15-17 American Management Association Mid-Winter Personnel Conference, Palmer House, Chicago, Ill.

18-19 EEI Commercial Cooking and Water Heating Committee, Atlanta, Ga.

29-Mar. 1 Pacific Coast Electrical Association Business Development Conference, Lafayette Hotel, Long Beach, Calif.

MARCH

17-18 EEI Industrial Relations Committee, Mayflower Hotel, Washington, D. C.

21-23 Southeastern Electric Exchange Annual Conference, Boca Raton Hotel and Club, Boca Raton, Fla.

23 Oklahoma Utilities Association Accounting Section Meeting, Biltmore Hotel, Oklahoma City, Okla.

24-25 Oklahoma Utilities Association Convention, Biltmore Hotel, Oklahoma City, Okla.

28-29 Pacific Coast Electrical Association Engineering and Operating Conference, San Francisco, Calif.

APRIL

3- 8 AIEE Engineers Joint Council Nuclear Congress, New York, N. Y.

4- 6 EEI Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

7- 8 EEI Power Survey Committee Meeting, EEI Headquarters, New York, N. Y.

7- 8 Southeastern Electric Exchange Engineering & Operation Section Conference, Roosevelt Hotel, New Orleans, La.

11-12 Pacific Coast Electrical Association Administrative Services Conference, Huntington-Sheraton Hotel, Pasadena, Calif.

20-22 Missouri Valley Electric Association Engineering Conference, President Hotel, Kansas City, Mo.

21-22 EEI Industrial Relations Committee Joint with the New England Regional Utility Group, Somerset Hotel, Boston, Mass.

25-27 EEI-AGA National Conference of Electric & Gas Utility Accountants, Hotels Commodore and Roosevelt, New York, N. Y.

27-29 NELPA Engineering and Operation Section Joint with Personnel and Safety Section, Hotel Florence, Missoula, Mont.

28-29 EEI Statistical Committee, New Orleans, La.

28-29 PEA Systems Operation Committee, Bedford Springs Hotel, Bedford, Pa.

MAY

1- 4 National Association of Electrical Distributors 52nd Annual Convention, Memorial Auditorium, Dallas, Texas

2- 4 EEI Purchasing & Stores Committee Annual Meeting, The Warwick, Philadelphia, Pa.

10-12 AIEE Farm Electrification Conference, Sheraton-Fontenell Hotel, Omaha, Nebr.

16-18 Pacific Coast Electrical Association Annual Convention, Stardust Hotel, Las Vegas, Nev.

23-25 NELPA Business Development Section, Chinook Hotel, Yakima, Wash.

JUNE

6- 8 EEI Convention, Atlantic City, N. J.

15-17 NELPA Accounting & Business Practice Section, Benson Hotel, Portland, Ore.

26-July 1 ASTM 63rd Annual Meeting and Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J.

JULY

21-22 EEI Industrial Relations Committee Joint with the Rocky Mountain Electrical League, Denver Hilton Hotel, Denver, Colo.

SEPTEMBER

7- 9 NELPA 53rd Annual Meeting, Glacier Park Lodge, Glacier, Mont.

15-16 EEI-AGA Accounting Division and Section Organization Meetings, The Pittsburgh Hilton, Pittsburgh, Pa.

23 Oklahoma Utilities Association Gas Division Meeting, Biltmore Hotel, Oklahoma City, Okla.

26-28 EEI Industrial Relations Committee 13th Annual Round Table Conference, Drake Hotel, Chicago, Ill.

28-29 Southeastern Electric Exchange Accounting Conference, Tides Hotel, St. Petersburg, Fla.

28-30 Indiana Electric Association 51st Annual Convention, French Lick-Sheraton Hotel, French Lick, Ind.

OCTOBER

10-12 AGA Annual Convention, Atlantic City, N. J.

20-22 PIP Second National Youth Conference on the Atom, Museum of Science & Industry, Chicago, Ill.

27-28 EEI Statistical Committee, Hot Springs, Va.

NOVEMBER

30-Dec. 2 EEI-AGA Electronics Seminar, St. Francis Hotel, San Francisco, Calif.

1959 Performance and Future Prospects of the Electric Industry

By Allen S. King

President, Edison Electric Institute, and
President, Northern States Power Co.

CONTINUING to advance in 1959 as the world leader in electric power, the electric utility industry in the United States scored impressive gains in output and a record addition to power capability, despite the prolonged steel strike.

In 1959, preliminary figures show that all components of the electric utility industry generated a record 707 billion kilowatt-hours, an increase of 62 billion kwhr, or 9.6 percent, over 1958 production. With the addition of railway and industrial generation, but excluding power used or lost within generating stations, total electric production for the nation during the year was 790 billion kwhr. This compares with an estimated 1959 production, excluding station use, of 244 billion kwhr by Russia, the second-ranking nation.

In generating capability, the electric utility industry reached a new high of 165 million kilowatts by the end of the year, a record increase of 15.3 million kw, or 10.3 percent, over the 1958 figure. The nation's total electric generating capability, including railway and industrial plants, was 183 million kw. It is estimated that Russia had 59 million kw by the end of 1959.

Forecasts

There is no indication that the Russians will be able to catch up with the United States at any time in the foreseeable future. The Russian goal calls for 110 to 112 million kw by 1965. In that year, the United States is expected to have 245 million kw, to lead Russia by more than 130 million kw.

A good indicator of a nation's total productive capacity and the well-being of its people is kilowatt-hour use per capita. For the United States in 1959, this was 4481 kwhr, compared with 1161 kwhr per capita estimated for the Soviet Union. The Russian goal for 1965 is about 2100 kwhr. This compares with a forecast of about 6000 kwhr per capita for that year in the United States.

Record Increase in Capability

There was a record increase in capability of 15.3 million kw on the nation's utility systems during 1959. Of the total increase, 11.8 million kw were on systems of investor-owned electric companies, and the remainder on systems of government agencies. The new additions increased America's electric utility generating capability to 164.8 million kw at the end of 1959, 10.3 percent higher than the 149.5 million kw for 1958.

With a 1959 peak demand of 129.3 million kw, the industry had 35.5 million kw of reserve capability, or a 27½ percent margin of capability over demand. The reserve alone was larger than all of the 1958 generating capacity of Great Britain, the third-ranking nation in power supply, and more than two-thirds of Russia's total generating capacity in 1958.

Construction expenditures by the electric companies in 1959 were $3.5 billion, their third largest expenditure on new plant and equipment. This brought the companies' total investment in plant and equipment to more than $46 billion at the end of the year.

HIGHLIGHTS OF 1959

• The electric utility industry in the United States in 1959 scored impressive gains.

• All components of the industry generated a record 707 billion kilowatt-hours, an increase of 62 billion kwhr, or 9.6 percent, over 1958 production. Including railway and industrial generation, total electric production for the year was 790 billion kwhr. This compares with an estimated 1959 production, excluding station use, of 244 billion kwhr by Russia.

• The total electric generating capability of the U. S. reached a new high of 183 million kw. It is estimated that Russia had 59 million kw by the end of 1959.

• Sales of the electric industry reached a record high of 625 billion kwhr; about 1.3 million customers were added, bringing the total at the year's end to 57.5 million. Home use of electricity reached a new high of 3550 kwhr, 184 kwhr over the 1958 average. Gross revenues of the nation's investor-owned electric companies were $9,150 million, 8.2 percent higher than the previous year's record of $8,454. Net income was $1,670 million, 9 percent greater than the 1958 figure of $1,532 million.

• Taxes paid by the investor-owned segment of the electric industry soared to an all-time high of an estimated $2,120 million, $157 million greater than the tax bill for 1958.

For 1960, expenditures by the electric companies for new construction are expected to be about $3.4 billion. About 11.9 million more kilowatts of new generating equipment will be added in 1960—the electric companies installing 9.3 million, and governmental agencies, 2.6 million.

Record Week

In attaining new highs in sales and customers, the electric industry established in December a new record for weekly output of about 14.2 billion kwhr, exceeding a record week late in August by less than 100 million kwhr. The 14-billion-kwhr mark was established for the first time in August, reflecting the increasing importance of air conditioning.

As an indication of the magnitude of power output in the United States, the output of the record week and the near-record week preceding it was more than Communist China's electric output of 27.5 billion kwhr for the entire year of 1958.

Sales and Customers

Sales of the electric industry in 1959 reached a new high of 625 billion kwhr, and were classified as follows, in Large Industrial, Residential, Commercial and Other categories.

Customer Classification	1959 Sales (Billion Kwhr)	Percent of Total	Billion Kwhr Increase Over 1958
Large Industrial	303	48.4	28
Residential	172	27.6	13
Commercial	112	17.9	11
Other	38	6.1	4
Total	625	100.0	56

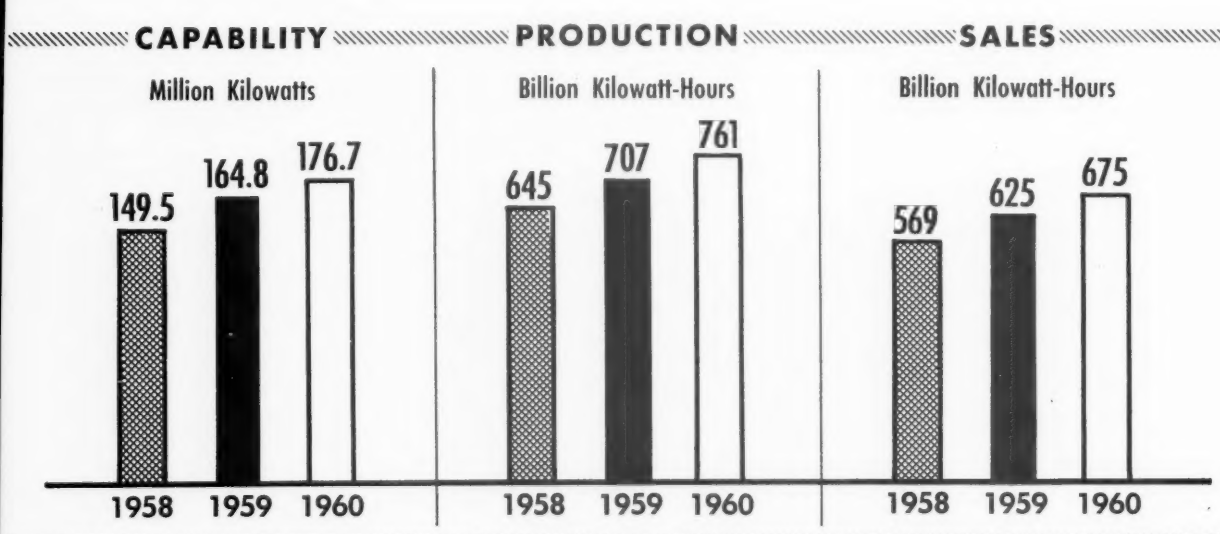
About 1.3 million customers were added in 1959, bringing the total at the end of the year to 57.5 million. Over 85 percent of these new customers are residential.

Home Use of Electricity

The use of electricity in the American home continued its rise, reaching a new high of 3550 kwhr as the annual average. This is 184 kwhr over the previous record in 1958. Residential demand is expected to keep advancing at its present rate; use of from 6,500 to 7,000 kwhr per home consumer by 1969 is seen.

In Russia, the average home uses about 400 kwhr a year compared to the 3550 kwhr consumed on the average in American homes. A far greater percentage of electric power in Russia is used for industrial purposes than in the United States—about 80 percent in the Soviet Union, and about 48 percent in America, but kilowatt-hours used for industrial purposes in the United States are some 70 percent greater than in Russia.

Gross revenues of the nation's investor-owned electric companies in 1959 were $9,150 million, 8.2 percent higher than the previous record of $8,454 million set in the recession year of 1958. Net income was $1,670 million in 1959, 9 percent greater than the 1958 figure of $1,532 million.



$2 Billion in Taxes Paid by Investor-Owned Companies

The investor-owned electric companies continued as a prime source of tax money, with anticipated payments for 1959 amounting to $2,120 million going to all levels of government, Federal, state and local. This figure is $157 million greater than the tax bill for the preceding year.

As the companies' largest single item of expense, the 1959 tax bill was equivalent to 23.2 cents out of each

dollar of gross revenue. Federal taxes took 58 percent, while state and local accounted for 42 percent.

The tax figures apply only to the investor-owned electric companies, which serve about 80 percent of the nation's consumers. Governmental power operations pay no Federal income taxes and in most cases no state or local taxes.

Four out of five of America's electric customers get their power from electric companies, and make substantial contributions to the burden of government through the taxes which must be included in their electric bills. It is gravely ironic, and highly inequitable, that the fifth electricity user—the customer of government-owned or financed power projects—pays nothing like his equitable share of the cost of government through his electric bill.

This inequity is heightened by the fact that the taxes of electric company customers help make possible government spending on more government power projects. And government power projects are being pushed, despite the fact that the investor-owned electric companies have consistently shown through their performance in the past and their planning to meet future needs that there is no necessity for government to be in the power field.

Unnecessary government spending is a widely recognized basic cause of inflation, a problem which is becoming of increasing concern to more and more people as they realize that inflation saps the economic well-being of those who can least afford it. The unnecessary spending going on and projected in the government power field is one area in which a strong blow against inflation could be struck, saving millions of dollars of taxpayers' money for more useful purposes.

Wages and Salaries

For 1959, the electric companies paid out in wages and salaries $1,570 million, an increase of 5 percent over the 1958 figure of $1,494 million.

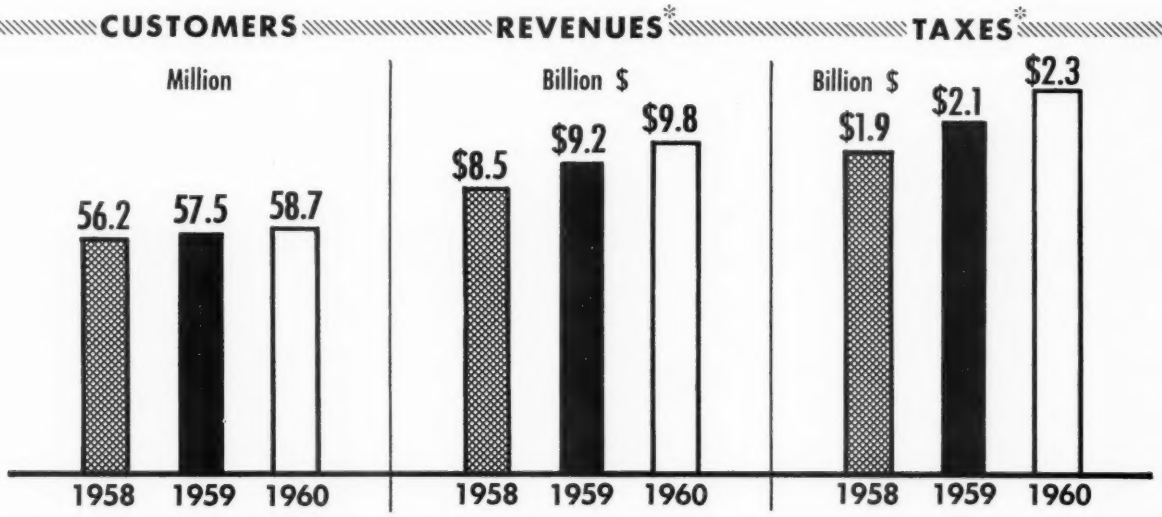
Fuel Cost

Another important expense item was fuel. In 1959, fuel cost the electric companies $1,420 million, a 5.9 percent increase over 1958.

Hydro-Steam Comparisons with Russia

Certain government power advocates, recently returned from Russia, have been referring to a few large Soviet hydro projects in a way designed to imply that the United States is falling behind in hydroelectric development. Actually, the United States now has about three times the hydro capacity of Russia. In 1959, hydro production in the U. S. totaled 152 billion kwhr—three times an estimated 50.7 billion kwhr for Russia. Nor do these government power advocates make note of the fact that both countries now have approximately 80 percent of their facilities in steam and 20 percent in hydro.

A highly significant omission in their statements is the fact that Premier Khrushchev has announced that the Soviet Union plans a greater emphasis on steam plants in the future. The new capacity expected by 1965 is to be about 85 percent steam and 15 percent hydro. The Russians have found, as we have in this country, that, with notable exceptions, electric power can be made more economically from steam.



* Investor-owned electric companies only. Figures on capability, production, sales and customers refer to the total industry.

Nuclear Power

In nuclear energy also, Russian experience and planning are similar to our own. Soviet scientists have said that their atomic power program is still in the research and development stage, as it is in the United States. Costs of producing power from atomic fuels in each country are above the costs from conventional fuels.

The size of the atomic development program in the United States is considerably larger than in Russia.

By the end of 1959, a little over five years since the passage of the 1954 Atomic Energy Act (which permitted industry for the first time to engage in development and construction of its own atomic plants), some 131 electric power companies and associated service organizations were participating in projects for the development and construction of atomic power plants and major research, development and study projects.

Electric power companies are participating in 16 plants which will have a combined capacity of about 1,400,000 kw and will require an estimated expenditure by the companies of more than $570 million.

This compares with the Russian program under which five atomic power plants totaling 565,000 kw are built or are under construction.

Value of Electric Service

Inflation continued as one of the nation's most serious problems, and this was reflected in the Consumers' Price Index, which moved to a new high of 125.5 in October, 1959 (1947-49 = 100). In contrast, the average revenue per kilowatt-hour sold to home consumers maintained its steady decline. In 1959, average revenue was 2.51 cents, down from 2.53 cents in the previous year.

Electricity's place in the family budget is very small, despite the many services it performs and the steadily increasing quantities being used. Latest available figures (1958) show that an average of only nine-tenths of 1 per cent of each dollar spent by American families living in cities went for electricity—and Americans enjoyed dozens of new services. Nearly five times as much was spent for liquor and tobacco as was spent on electricity. Beer, whiskey, cigarettes and cigars took up 4.3 percent of the consumer's dollar. The ladies spent as much on cosmetics as was spent on electricity.

Rate Increases and Inflation

Regulatory commissions continue to recognize the effects of inflation in practically all aspects of operational and capital costs, and the necessity for the financial strength essential to the provision of adequate electric service.

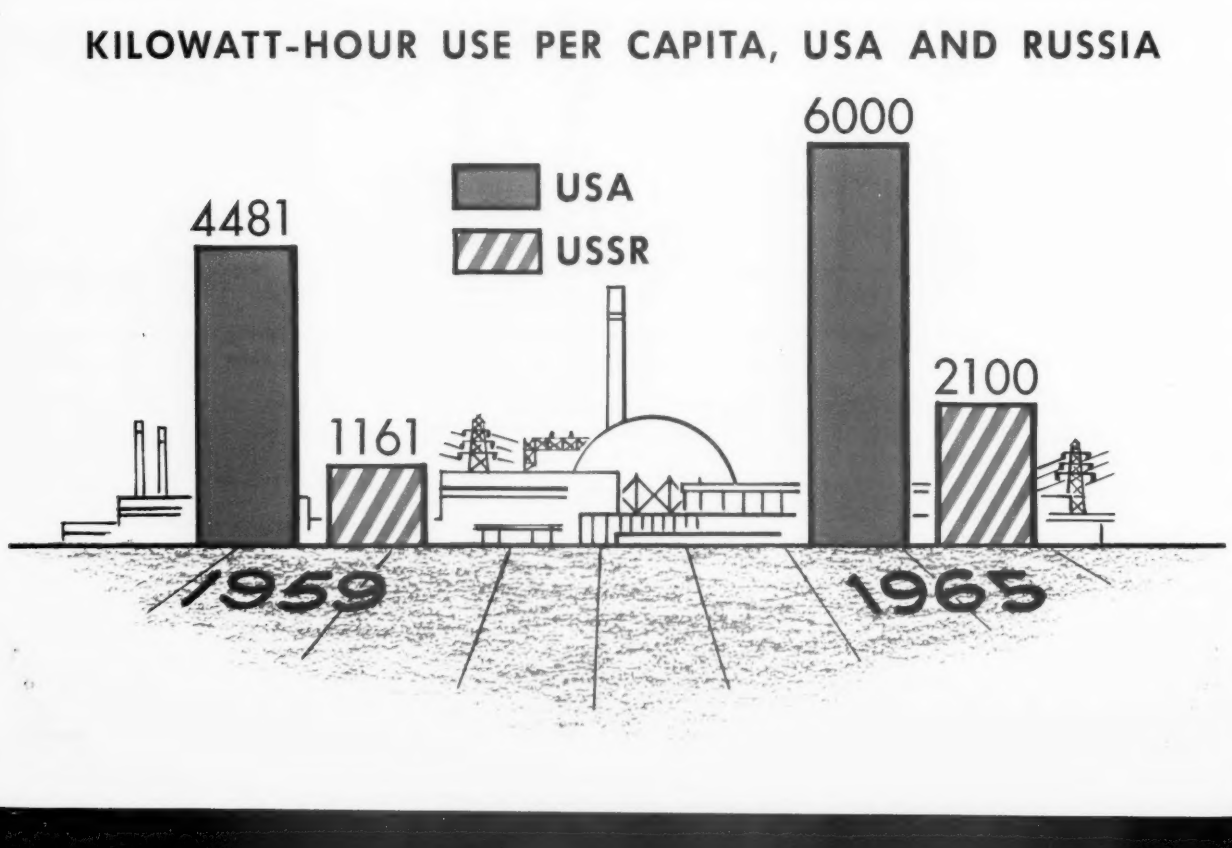
From 1946 through the first 11 months of 1959, according to tabulations of the Edison Electric Institute, there were 577 applications for rate increases, involving 223 companies. Of the 577 applications, 515 were granted, 27 are pending, 13 were withdrawn, and 22 denied. The 1959 record to December 1st shows 48 actions. Thirty-one increases were granted, one was denied, and 16 of the 1959 applications are still pending.

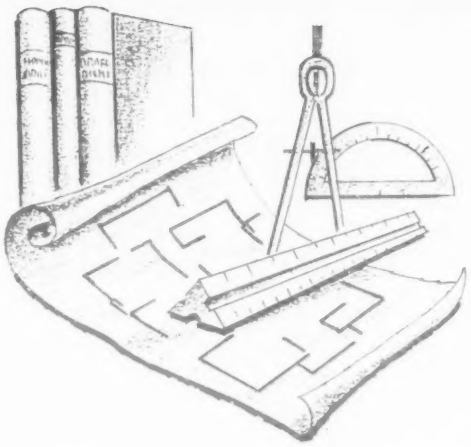
Live Better Electrically Program

The Live Better Electrically Program of the Edison Electric Institute is scheduled for 1960 with an estimated budget of $2½ million. A total of 141 member companies will take part in the Live Better Electrically Program, including seven members participating for the first time.

(*Continued on page* 12)

KILOWATT-HOUR USE PER CAPITA, USA AND RUSSIA





New EEI Booklet

Aiding in Education

"AIDING in Education," a manual designed to aid electric companies in secondary level school programs, has just been published by EEI.

The 32-page booklet was developed by the EEI Committee on Relations with Educational Institutions which is under the Chairmanship of S. R. Knapp, President of The Connecticut Light & Power Co. It is based on the committee's recent survey of electric company educational aid activities in which 88 companies participated and with reference to similar manuals published by other organizations. The text was prepared in consultation with members of the staff of the National Education Association.

Basically designed for use within electric companies, "Aiding in Education" should be useful to all those in the company who deal with educational aid. It might be of particular interest to companies planning to enlarge their educational aid activities or to enter the field for the first time.

The manual should be of value in working with schools to assist in the encouragement of students to enter the power industry.

The booklet is in five sections. A brief summary of each section follows.

Part I—This section discusses the importance of scientific and technical education in America today, the role electric companies can play in encouraging better training for students interested in these fields and the attitude of educators toward business-education cooperation.

Part II—This section outlines some of the things a company should do in setting up such a program and describes the procedures which companies have followed both in dealing with education and in organizing their internal affairs to handle the program most effectively.

Part III—This section provides a pattern for companies planning to set up a formal educational aid program. It outlines the steps taken by a hypothetical company in setting up a formal program and describes 23 effective ways in which companies can cooperate successfully with schools.

Part IV—This section gives an indication of what other electric companies are doing in the field of educational aid by describing two successful programs, that of a relatively large company and of a smaller one.

Part V—This section provides a list of organizations of local, state and national levels with which to cooperate in educational aid activities, the names of organizations providing information on business-education cooperation and a bibliography of selected publications which pertain to this field.

"Aiding in Education" may be ordered from Edison Electric Institute, 750 Third Ave., New York 17, N. Y. Single copies are 75 cents each, 2 to 49 copies are 65 cents each and 50 or more copies are 45 cents each.

School Heating Report Revised by Committee

AN up-to-date report on electrically heated schools in the United States has been prepared by the EEI Electric Space Heating and Air Conditioning Committee.

Titled "Modern Schools Are Heated Electrically," the 20-page illustrated booklet printed in two colors and plastic-comb bound is the second such report published by EEI on this subject. The report is prefaced by a section outlining the advantages of electric heat in schools. It lists 212 schools in 29 states which have installed electric heating facilities. Reports on three Canadian schools are included in the booklet. Data include the number of classrooms and other rooms, connected heating load, type of heating equipment, degree days and date of installation.

Material was compiled from information provided by EEI member companies, 22 manufacturers of electric heating equipment and various educational agencies.

The report is available from the Sales Division, Edison Electric Institute, 750 Third Ave., New York 17, N. Y., at $1.00 per single copy for members of EEI and $1.25 to non-members. Quantity prices are available upon request.

Fourth Industrial Electric Heating Conference Planned

THE fourth National Industrial Electric Heating Conference, to be held in Cincinnati, Ohio, Feb. 1-4, will provide for an exchange of ideas on the latest technical information sales aids and sales training procedures between representatives of the electric utility companies and manufacturers of industrial electrical equipment.

The conference will be sponsored by The Industrial Electrification Council. The Council's Executive Committee is under the Chairmanship of M. I. Allen, Vice President, Sales, Philadelphia Electric Co. The Program Committee is under the Chairmanship of W. R. Ankrom, Director of Industrial Sales, American Electric Power Service Corp., and Q. Q. Quinn, Industrial Sales Manager, The Connecticut Light & Power Co.

Discussion Periods Planned

At the conference, five of the seven sessions will be followed by discussion periods. A sixth session will be followed by a panel discussion.

On Monday morning, Feb. 1, P. W. McCormick, Industrial Sales Manager, Union Electric Co., and Chairman of the EEI Industrial Power & Heating Committee, will welcome the group, which will meet at the Netherland Hilton Hotel.

The Conference program follows:

Feb. 1, Morning Session—"Market for Electric Heat," R. W. Wyman, Manager, Industrial Sales, The Cleveland Electric Illuminating Co.

"Heating of Liquids," R. A. Gehr, Manager of Sales, Heaters and Devices, Industrial Heating Department, General Electric Co.

Case Studies—"Oil Heating," J. R. Wark, Power Sales Engineer, Indianapolis Power & Light Co.; "Water Heating," J. R. Murphy, Industrial Sales Department, The Cleveland Electric Illuminating Co.; "Asphalt Heating," J. B. McNall, Senior Industrial Power Engineer, West Penn Power Co.

Feb. 1, Afternoon Session—"Heating of Solids," C. F. Kreiser, General Sales Manager, Edwin L. Wiegand Co.

Case Studies—"Soft Metal Melting," L. E. Mueller, Power Sales Engineer, The Detroit Edison Co.; "Platen Heating," W. A. Mizer, Industrial Engineer, Electric Sales Department, The Cincinnati Gas & Electric Co.; "Extrusion Heating," W. A. Schneidenbach, Power Sales Engineer, Consumers Power Co.; "Snow Melting," L. R. Menteer, Power Sales Representative, Niagara Mohawk Power Corp.

"A Look into the Future of Metals," Dr. S. W. Herwald, Vice President, Research, Westinghouse Electric Corp.

Feb. 2, Morning Session—"Present Day Trends in Direct Arc Furnace Applications," W. E. Lewis, Lectromelt Furnace Division, McGraw Edison Co.

"Induction Melting," J. R. Coley, Sales Manager, Electrothermic Division, Ajax Magnethermic Corp.

"Vacuum Melting," Dr. W. E. Jones, General Manager, Special Alloys Section, Metallurgical Products Department, General Electric Co.

Feb. 2, Afternoon Session—"The Treatment of Metals," Dr. H. B. Osborn, Jr., District Manager, TOCCO Division, The Ohio Crankshaft Co.

"Aluminizing," O. W. Noeske, Application Engineer, Rectifier and Induction Heating Section, Allis Chalmers Manufacturing Co.

"The Future Sources of Electricity," Dr. H. K. Ihrig, Vice President in Charge of Research, Allis Chalmers Manufacturing Co.

Feb. 3, Morning Session—"Radiant Heating," L. A. Strobel, Industrial Heating Engineer, The Detroit Edison Co.

Case Studies—"Metal Sheath," W. L. Thomson, Manager, Special Products Division, Edwin L. Wiegand Co.; "Lamps and Quartz Tubes," I. J. Barber, Barber Associates, Inc.; "Glass Panels," R. L. Callard, Product Specialist, Plant Equipment Sales Department, Technical Products Division, Corning Glass Works.

Feb. 3, Afternoon Session—"Electric Comfort Heating Should Appeal to Your Industrial Customer," W. R. Ankrom, Director of Industrial Sales, American Electric Power Service Corp.

Preview of IEC Training Course on Industrial Electric Comfort and Space Heating—Section I, "Direct Heating," R. L. Boyd, Product Manager, Commercial Comfort Heating Division, Edwin L. Wiegand Co.; Section II, "Heat Pumps," J. C. Zeiler, Supervisor, Commercial and Industrial Sales, Indiana & Michigan Electric Co.

"Have You Done Any Diamond Mining Lately?", B. A. Fleming, Vice President, Edwin L. Wiegand Co.

Feb. 4, Morning Session—"Mass Heating by Induction for Production," J. M. Edwards, Manager, Com-

mercial Engineering, Induction Heating Department, Westinghouse Electric Corp.

"New Uses for Dielectric Heating," Glenn Williams, Rectifier Section, Allis Chalmers Manufacturing Co.

"New Opportunities for Electric Furnaces," K. G. MacDonald, Manager, Heat Processing Equipment Sales, Industrial Heating Department, General Electric Co.

Dunn and Vennard to Speak

On the evening of Monday, Feb. 1, there will be a "get acquainted" banquet at the Restaurant Continental of the Netherland Hilton. J. R. Hartman, Vice President, The Cincinnati Gas & Electric Co., will be toastmaster. Guest speaker will be O. L. Dunn, General Manager, Motor and Generator Division, General Electric Co., whose talk will be titled, "Opportunities Unlimited."

Edwin Vennard, Vice President and Managing Director, EEI, as the luncheon speaker on Thursday, Feb. 4, will discuss "Selling in Tomorrow's Market." Toastmaster at the luncheon will be W. A. Mizer, Industrial Engineer, Electric Sales Department, The Cincinnati Gas & Electric Co.

Sales of Most Major Electric Appliances Top All Previous Records During 1959

TOTAL industry unit sales of most major electric appliances broke all previous records in 1959, the National Electrical Manufacturers Association has announced.

As a group, major electric appliances in the scope of NEMA hit the highest shipment level since the record year of 1950 and showed a 17 percent gain over the 1958 mark. A further gain of 3 percent is forecast for 1960.

Individually, four of the major electric appliances—built-in electric ranges, food waste disposers, dishwashers and food freezers—topped all past industry sales records. Shipments of built-in electric ranges last year reached 750,000 units for a gain of 38 percent over the previous year. Food waste disposers registered a 27 percent gain with 785,000 units shipped; dishwashers, with 525,000 units shipped, showed a 24 percent gain, and food freezers, with 1,200,000 units shipped, registered a 9 percent gain.

Electric refrigerators and free-standing ranges topped 1958 industry sales marks by 20 and 15 percent, respectively, with shipments of refrigerators reaching 3,750,000 and shipments of free-standing ranges hitting 930,000. The electric water heater was the only major electric appliance to show a drop in industry sales last year over 1958. Shipments in 1959 totaled 740,000 units, 10 percent below the 823,500 units shipped in 1958.

It is anticipated that all major electric appliances, with the exception of food freezers, will show increases in industry sales in 1960 over 1959. Shipments of freezers are expected to remain steady at 1,200,000 next year—the same mark as that reached in 1959.

Georgia Power Adequate Wiring Plan Approved

A PLAN designed by the Georgia Power Co. to help eliminate the serious problem of inadequate wiring has been approved by the Georgia Public Service Commission, John J. McDonough, President of the company, has announced.

The power company proposes to pay a large share of the cost of installing heavy-duty service entrance wiring in residences on its lines. The payments will be made to the electrical contractor doing the work, and the wiring will be the property of the company. A customer, to qualify, must install certain circuits of his own, as well as certain designated appliances requiring heavy-duty wiring.

Mr. McDonough pointed out that "far too many homes still are being constructed with wiring insufficient to handle modern-day demands. We feel the additional cost of good wiring is deterring many contractors and homeowners from building homes with enough power outlets and good wiring to meet today's requirements."

He added that service entrances for which the company will make installation and equipment payments to the electrical contractor will definitely be of a capacity to meet not only today's needs, but those of the future.

Georgia Power engineers have estimated that the plan will benefit thousands of Georgians now unable to use such appliances as electric water heaters, ranges and clothes dryers because of inadequate residential wiring. The plan was scheduled to go into operation Jan. 1 of this year.

Live Better Electrically Program Switches to National Magazine

IN a major shift in consumer media, the Live Better Electrically Program has dropped its proposed daytime network TV and local spot TV schedule for 1960 in favor of increased national magazine concentration.

King Announces Change

This change in advertising schedule, involving half a million dollars, was announced by Allen S. King, President of Edison Electric Institute, and President of Northern States Power Co.

"Television is an excellent medium, with powerful value," Mr. King noted, "but for the EEI Live Better Electrically Program it is better to do a good job in one medium (magazines) than just a fair job in two media (magazines and TV).

"The relatively limited budget for the broad and important LBE message does not permit effective use of two major national media during 1960. To employ TV and magazines under these circumstances would be to dilute the schedules in both to a point of questionable value," he added.

The reallocated TV funds will go into *Life* magazine to give added strength to the mass circulation consumer magazines. Insertions in *Life* will add five spreads to the six single pages originally scheduled. All are four-color ads.

This ad—a full page in color—will appear in the February issue of the *Better Homes & Gardens* magazine.

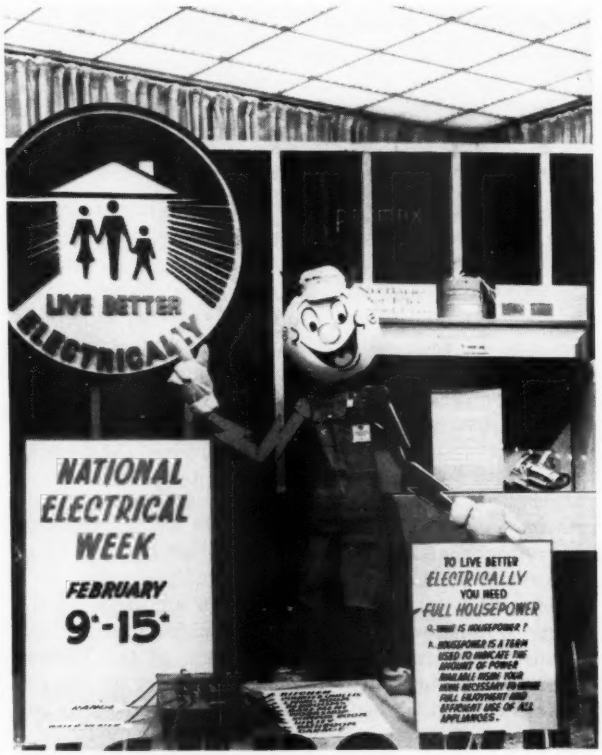
Variations on the original creative format announced last fall have been made so that some of the Live Better Electrically ads can be more competitive with gas. Each of these ads will concentrate on a single competitive advantage while subordinating other advantages.

Better Homes & Gardens and *Saturday Evening Post* are also included in the line-up of major magazines to feature Live Better Electrically ads. *BH&G* will carry nine individual insertions for a total of 10 pages. The *Post* will carry seven single-page insertions, plus the Christmas "Give Better Electrically" advertacular featured during the past two years.

During National Home Week a multi-page ad spectacu-

LIGHT FOR LIVING

Steps Up Advertising; Drops TV



An electric utility company's National Electrical Week window display highlights HOUSEPOWER and LBE.

lar is planned for *Life* magazine. This "blockbuster" will transform some 27 pages of EEI's and manufacturers' messages into a single ad spectacular stressing the concept of total electric living.

The purpose of EEI's Live Better Electrically advertising program is to set a backdrop for local selling efforts and the Live Better Electrically theme. Lighting, full HOUSEPOWER, electric ranges, electric water heaters and electric dryers, electric house-heating and cooling and the Medallion Home are to be featured. It is designed to serve as a rallying point for successful selling action by the electric utilities and trade allies in their communities.

A total of 44 full-color pages will be carried in consumer magazines which will serve as the backbone medium to the 1960 Live Better Electrically campaign.

The Jan. 2, 1960, issue of *Publisher's Auxiliary* which is distributed to nearly 10,000 editors of daily and weekly newspapers, carried a special Live Better Electrically section.

Important Editorial Information

The supplement provided important editorial information on Light for Living, electric dishwashers, electric water heaters, electric ranges and electric housewares.

There was also a page covering Full Housepower which is of interest to local electrical contractors. A page on new and modernized Medallion Homes, modern electric kitchen appliances, plus heating and cooling, was sponsored by EEI.

The American Home Lighting Institute sponsored the page on Light for Living; the National Association of Electrical Manufacturers sponsored the page on major appliances and the National Wiring Bureau sponsored the Housepower page.

A major story was devoted to National Electrical Week, to be celebrated this year from Feb. 7-13. The story pointed out that during National Electrical Week all segments of the electric industry join together to mark the birthday of Thomas A. Edison. During the celebration, the story said, manufacturers, utilities, contractors and dealers join to give the consumer assistance in bringing her home up to the standards established for the Medallion Homes.

HOUSEPOWER
TRADE MARK

The Electric Industry in 1959 and Future Prospects

(*Continued from page 6*)

The 1960 advertising features the competitive selling theme line, "Electricity Is Your Better Way to Cook, Heat, Cool, etc." with emphasis on HOUSEPOWER, lighting, the Medallion Home, major load-building appliances and electric house heating.

The media budget will be concentrated in consumer magazines to achieve greater frequency and impact.

Some Predictions for 1960

Looking ahead to the next 12 months, the electric industry is planning and working towards establishment of new records in generating capability, production, sales and revenues.

By the end of 1960, the total generating capability of the electric industry is expected to be advanced 7.2 percent over 1959, to reach 176.7 million kw. Electricity production is expected to be 7.7 percent higher than the preceding year, with 1960 generation totaling 761 billion kwhr. Sales by all parts of the industry will advance 8 percent to a new peak of 675 billion kwhr. Customers will reach a total of 58.7 million. The revenues of the investor-owned electric companies should be about 7 percent greater than in the preceding year, totaling about $9.8 billion for 1960.

Competing with Russia

Electric power, vital energy of modern civilization, is an important factor in the competition between the United States and Russia. How the electric supply system should be operated is also part of this competition, since it has significant bearing on the form of government under which Americans will live.

The United States has achieved its position of world leadership in electric power through the growth of the electric utility industry in an atmosphere of free enterprise. This has been so in the eight decades since Edison and a few courageous backers risked their money developing a seemingly fantastic system for electric lighting—the basis for electric power systems throughout the world.

By financing in the free market, the nation's investor-owned electric companies have been able to build an unequaled power supply to meet America's needs. Looking ahead to the future, the companies are fully confident that they can continue to maintain U. S. leadership in electric power under the free enterprise system. But despite the record of accomplishment, there continues to be agitation for more government spending for government power projects.

The problem resolves itself into two questions: Should the power business be financed by individuals and groups free to invest or not to invest in the business, and owned and controlled by the investors operating under government regulation? Or should it be financed by Federal government expenditures and owned or controlled by the government?

The Threat of Government Ownership

If the second way—the way of government ownership and financing—were chosen, a highly significant portion of our economy would then be patterned on the Russian system. Would government ownership of the power business then lead to government ownership of railroads, coal, oil, steel, and other industries?

In the drama of U. S.-Russian competition in the broad economic arena, Americans will have to keep clear in their minds that under the Russian system, government owns or controls all business and the Russian people work for the government. Basically, the issue is *not* that of two great nations struggling for world pre-eminence. It is rather the struggle of two types of civilization. One is based on human liberty, the other on government domination.

If we, as a nation, were to adopt in any field—in the power business or any other—philosophies and practices of government control that are typical of the Russian system, we would destroy the characteristics of freedom and initiative which brought us our world leadership and enable us to keep it. We would then not only lose the competition with Russia, we would lose the human values we sought to save.

'Cable Operation, 1957' Available from EEI

"CABLE OPERATION, 1957," a joint report of the Committee on Power Distribution, Association of Edison Illuminating Companies, and the Transmission and Distribution Committee, Edison Electric Institute, is available from EEI.

The report covers operating experience with high-voltage (above 7.5 kv between phases), paper-insulated cable, joints and terminations during 1957 as reported by 15 companies which operated 19,225 miles of duct-lay cable at the end of that year.

The report shows that total cable trouble rate for paper-insulated, duct-lay cable decreased from 8.1 in 1956 to 7.6 in 1957.

The joint trouble rate remained about the same—1.29 in 1956 compared to 1.31 in 1957.

The termination trouble rate decreased from 0.88 in 1956 to 0.75 in 1957.

Price to member companies and their employees for the report is 70 cents. Price to non-members in the United States is $1.90. Order from EEI, 750 Third Ave., New York 17, N. Y.

Electric House Heating Exposition to Be Held March 21-23 in Chicago

THE nation's first symposium on electric house heating will be held at the First National House Heating Exposition, March 21-23, at the Hotel Sherman, Chicago.

Sponsored by NEMA

The exposition will be sponsored by the Electric House Heating Equipment Section of the National Electrical Manufacturers Association.

Subjects covered by the symposium, to be held concurrently with the exposition, were selected initially by representatives of the NEMA Electric House Heating Equipment Section in consultation with the Live Better Electrically Program, the National Association of Electrical Distributors, the Edison Electric Institute, the National Rural Electric Cooperative Association, the American Public Power Association and National Mineral Wool Association.

The show is expected to attract well over 2,000 visitors, including power suppliers, electrical distributors, electrical contractors, architects, builders, electrical inspectors, electrical engineers, component manufacturers, Federal and state housing administration leaders, and representatives of real estate, mortgage and banking interests.

Products to be displayed will include the following:

- Residential, commercial, industrial direct-resistance comfort heating equipment of the following types:
  1. Cable units for installation as radiant heating systems.
  2. Radiant panels of either glass or other materials with, or without, integral component motors, thermostats or other accessories.
  3. Wall or ceiling heaters, convection type, natural or fan forced.
  4. Floor-standing heaters which are adaptations of products described in items 2 and 3 above which are suitable for operation at voltages in excess of 200 volts.
  5. Electric furnaces, both floor and central types.
  6. Baseboard heaters.
  7. Electric steam radiators.
- Heat pumps—room and central only if combined with electric heating.
- Insulation and insulation equipment.
- Controls (timers, cutouts), thermostats, humidstats.
- Trade press and trade association materials.

The exposition will present the latest and newest of all types of electric direct-resistance heating equipment, zone-type heat pumps, central heat pump systems, insulation and electric controls for heating equipment. For admission to view exhibits there is no charge.

Home Insulation Materials to Be Shown

Important among the exhibitors in the show will be producers of home insulating materials—both blown and batt types—and of electrical control equipment. The vital need of fully insulating the home to heat it economically and successfully by electric equipment is recognized and a prominent spot given to insulation techniques on the first day's program. Already one maker of machines for blowing insulation is listed.

The registration fee is $20 for admission to the five sessions and industry luncheon, provided registration is in advance; at the door the total charge is $25.

Consolidated Edison Gives Artificial Kidneys to NYU

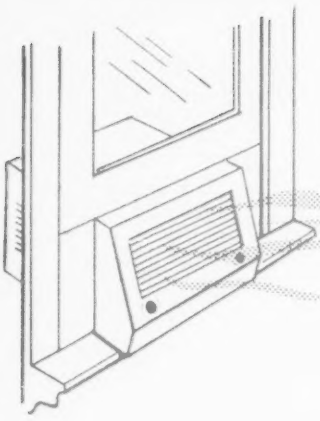
TWO artificial kidneys, used to aid patients whose lives are endangered because of the failure of their kidneys, have been contributed to the New York University's Medical Center by Consolidated Edison of New York, Inc.

They were presented at a special ceremony at the Medical Center's University Hospital to Dr. George E. Armstrong, Director of the Center, and Dr. Robert S. Hotchkiss, Professor and Chairman of the Department of Urology, NYU Post-Graduate Medical School. The following representatives of Consolidated Edison made the presentation: Winthrop E. Mange, Vice President; Dr. S. Charles Franco, Executive Medical Director, and Franklin E. Vilas, Associate Director of Community Relations.

The chief purpose of the mechanical kidney is to provide relief for persons whose kidneys have failed by supplying a means for cleansing the impurities of the blood until the kidneys are again able to function. In addition, it helps to prepare patients with badly damaged kidneys to withstand operations.

Second Presentation

This is the second time that Consolidated Edison has given the Medical Center these devices. In 1950 the first artificial kidney was installed in the New York University's Fourth Division of Bellevue Hospital—and was the only one of its kind in a municipal hospital at the time it was presented.



Air Conditioning and High Bills

By Ken Hinckley
Manager, Customer Service, Houston Lighting & Power Co.

ALL companies have customers who have from time to time been "hot and bothered." Here on the Texas Gulf Coast some of our hottest customers are the coolest.

This customer who is hot and bothered was first noticed in this condition last summer when he decided to air condition his home.

Then, after 30 days of comfort-cooled, dust-free, humidity-controlled living, he received his electric service bill, and firmly insists his "light bill" is ridiculous.

This customer's problem is not to be considered lightly. Here is a need not only to regain a friend for the company but to convince the customer also that he profits by feeding our particular brand of energy into this cooling device.

Houston Lighting & Power Co. views this customer relations problem with a confidence achieved only through experience. Having lived for many years with the customer bill complaints created by air conditioning use, it is our desire to pass along the benefit of these thousands of investigations.

To qualify our position, it should be pointed out that Houston has claimed the title, "Air Conditioned Capital of the World" for many years now. Houston claims 0.66 tons of air conditioning installed per capita, so the title is no mere Texas brag. This tonnage includes most of the office buildings and commercial establishments, 48 percent of the residences, hundreds of churches, schools, and factories—even dairy barns and henhouses.

Four Situations

Our main concern is with the residential user who is confronting us with his increased monthly bill. Now, all of us have high bill complaints, but the user of air conditioning poses problems unique to that appliance. We can, however, confine the situations, categorically, to only four that cause the air-conditioned customer to get in touch with us:

- The new user whose first bill is more than he anticipated.
- The user who has compared his bill with another customer.
- The user whose bill has increased over a prior period for no apparent reason.
- The user who is in a new home with the same amount of air conditioning—yet received an increased bill.

The New User

That new user who is unhappy about his first bill is a comparative cinch to handle. It is necessary only to face him with the financial facts of hourly operating cost. His problem is that he just didn't know what cost to expect for this first-class living. All he knew was that his neighbor, Mr. Jones, had air conditioning, and it seemed the way to really live. His primary concern the first month had been the amount of the down payment and the impact of the monthly payments in order to start living in the Jones manner.

A survey made of new users on this subject last year showed interesting results. Nine out of 10 customers who bought their first air conditioning equipment *did not even discuss operating cost with the salesman.* The 10 percent which did question this important facet of air conditioned living received various answers. Some salesmen, it seems, are not overly given to veracity when a sale has reached the point of discussing operating costs.

Some dealer advertising has stated that the new "One-Ton Frigid Midget" would keep a family cool for only $5 a month. What the ad didn't say, of course, is that the unit could be operated only on Mondays, Wednesdays and Fridays to do this. Cases such as these, fortunately, are the exception. The majority of our dealer friends are most responsible and most cooperative.

One last problem we have encountered with the new user is in determining just what size unit he is trying to operate for $10 a month. This, too, concerns the dealer. We furnish the distributors, dealers and our own contact personnel with average hourly operating cost figures for the various size units. We view a "one-ton" unit, for example, as a machine capable of dispelling 12,000 Btu's of heat. What we discovered, however, was that last year alone, the 29 best known brand-name manufacturers put out 172 different models of a so-called "one-ton" unit. We say "so-called" only because a closer examination showed the Btu ratings to range from 7800 up to 13,200, and wattage input requirements allegedly ranged from 850 to 2070. To confuse further an already confused customer, many *one-horsepower* units automatically be-

come *one-ton* machines in the sales talk of some vendors.

Thus, operational costs of "one-ton" units have a wide range, and we, in turn, face a problem of testing bill equity in the light of such a range of equipment. We, therefore, stress *average* hourly operating cost, which usually enables us to resolve most of the new users' bill inquiries. The important angle in these cases is actually to give the customer some reasonable yardstick to go by —to show him air conditioning equipment is not excessively expensive to operate.

The Bill Matcher

Most of our air conditioning bill complaints come from the customer who has compared his bill with his friend over the back fence, the bridge table or the 19th hole. We call him a "bill matcher." Invariably, he vows to us that his friend Charlie has more tonnage, more house and more kids than he does, yet ends up with a lower electric bill. Here is both a genuine and a difficult problem.

First, we try to get across the idea that because of the many variables in air-conditioning operating cost, it is difficult to compare bills. It's like trying to compare grocery budgets—some families just set a better table than others.

This situation requires getting down to basics, the first and most important of which is to compare operation time. Charlie may have more units but is a fresh air fiend at night, whereas Mr. Bill Matcher may run his units night and day. It is important to remember that the number and size of appliances in a home do not, in themselves, determine the amount of the bill. The manner in which they are operated is equally important.

It has already been pointed out how the wattage requirements, as well as the efficiency, vary between units that are nominally the same. This difference provides another avenue for examination in convincing the Bill Matcher that there is more to this bill difference than meets the eye.

In the case of central cooling systems, the thermostat setting can have a major influence on the bill size and is a primary reason for bill differences. It is again basic that a unit that is maintaining a 72° temperature is going to work more than one that is being asked only to level at 76°. We use a rule of thumb of $3 added for each thermostat degree below 78° for a five-ton unit. We have found the thermostat setting to be most significant when rationalizing bill size.

To validate this, we have a case study here of two homes of the same size and construction with a five-ton central system in each. One customer set the thermostat on 73°, while the other maintained 78°. For one billing month, the unit maintaining 78° used 979 kwhr for 140 hours of operation. The cooler house required 1848 kwhr to operate the compressor 264 hours at a monthly cost of $13.03 more, or a 41 percent difference between the two bills.

Another difference between homes with central cooling systems depends upon whether the units are air or water cooled. On a short-haul comparison basis, we have found the water-cooled system to operate as much as 15 percent cheaper.

With these and other factors, we are usually able to convince the Bill Matcher that friend Charlie isn't just living under a lucky star.

The Bill Saver

The customer who is almost as vocal as the Bill Matcher is the Bill Saver. He is the one who audits each bill against those received in prior periods. Any upward variation is questioned. Most of these inquiries, however, are understandable and legitimate. Put yourself in the position of the customer who has added no appliances and who contends his living habits, including use of his air conditioning, have been unchanged. Yet, his August bill this year has increased considerably over his August bill of a year ago. He wants, and should be able to get, an answer to this unexpected turn of events.

The answer in 90 percent of these cases is the weather, and the explanation is basic. The higher the outside temperature, the more the unit is required to operate to maintain the desired inside temperature. Thus, the hotter the weather, the higher the bill. We measure this temperature variation from month to month and season to season in terms of degree days. Each degree the average daily temperature exceeds 75 is recorded as a "degree day."

Each service representative has available a summary of the total degree days by months and by billing controls, for a three-year period. She can note, for example, that bills rendered through the meter reading date of August 12 were for a period having 380 degree days. She can then observe that for the same billing control the previous year, the degree days were a cooler 240. She is, therefore, better equipped to explain a bill that has jumped from $25 to $40 when compared to the same period a year ago.

Second in importance to the influence of the weather is the need for maintenance. In the situation posed by the Bill Saver, a need for servicing his unit could cause not only an increased bill but a reduction in efficiency of the unit. For example, a filter should be changed or cleaned once a month for maximum effectiveness. Cooling towers should be kept free of leaves and debris and should be acidized at least every two years. Cooling coils and condensers need to be dust-free and all systems should be checked periodically for loss of gas.

One engineer estimates that 1/84 of an inch of dust on the condenser coils can increase operating costs 10 percent!

Belts and pulleys get slack and fan motor bearings need oil. We have found the average customer to be unaware of the many maintenance needs that are necessary to insure economical and efficient cooling, and he is often much more rational when apprised of these needs. So, when Mr. Bill Saver fails to reconcile his account difference, the mention of maintenance needs is always effective and likely necessary.

One other factor is worth consideration in dealing with irate customers. With five-ton central systems, an all-electric residence can easily use 100 kwhr or more a day. Monthly bill periods that range from 29 to 32 days, therefore, can contribute in a small degree to an increased bill from one period as compared to another.

The New Home Owner

The fourth group of complaints concerns the new home owner who has the same tonnage and same operating habits of his air conditioning at the new place, yet has received a bill that is more than he ever paid at the previous address.

Here, we deal with the various facets of home construction as they affect air conditioning operating cost:

Is the equipment of proper size to cool the new area? Perhaps there is more area to be cooled in the new home, which causes the units to run more. If there is insufficient tonnage, the equipment could conceivably run continuously—with resulting higher bills.

Is the new home properly insulated? The value of proper insulation as a factor in bill reduction cannot be emphasized too strongly to the customer. Tests have shown us that often as much as 50-75 percent of residential cooling is lost because of inadequate insulation in walls, ceilings and floors. Only two inches of mineral wool insulation in a wall, for example, has almost twice the resistance to heat as a wall having four-inch brick, building paper, one-inch sheathing, four-inch stud space, one-half-inch sheet rock and the protection provided by inside and outside air surfaces. It is, thus, quite possible that the new home to which the customer has moved is not so well insulated as the previous one.

How about shading and roof line? Trees that shade the roof, particularly in the afternoon, are like money in the bank to the customer having push-button weather. The pitch and color of the roof are also important in reflecting costly sun rays from the house. To illustrate: a 2000-square-foot home with a flat black roof has a potential heat gain of 180,700 Btu. This *same house* with a white 45° peaked roof could reduce the heat gain to 92,000 Btu, or a difference of 7½ tons of air conditioning!

Does the new house have more wall area exposed to the sun? As far as air conditioning is concerned, people who live in glass houses shouldn't. Large picture windows and sliding glass doors, particularly on the western exposure, invite heat. Short roof eaves that expose more wall area to the sun are also cause for concern. Units that catch the sun's full blast cause increased head pressures, on both the compressor and the customer.

How's the attic? One that isn't properly ventilated becomes a heat trap—up to 150° in our Southwestern sun.

And how about the weatherstripping? Vented stove and dryer? Kitchen exhaust fan? Draped windows? Snug fireplace damper? Adequate wiring? Light colored outside walls? Shrubbery against walls to break heat rays?

Was the air conditioning system installed properly? We have found many high bills to have been caused by faulty installation. These discoveries came as a result of field surveys that were made when all else failed to explain an unusually high bill. Examples of some of the things these trips yielded were: condenser fan exhausting on a picture window; unit exhausting into an attic that was poorly ventilated; attic fan opening not completely closed and allowing cold air to escape into attic; return air register located adjacent to kitchen stove; portion of ducts found not insulated, and air return registers found to be under-sized.

Obviously, a simple discussion of only four basic types of air conditioning complaints cannot possibly solve all problems. Even our long and wide experience occasionally fails to cover specific customer situations.

Many companies may benefit, however, from this general treatment of the problem, as indoor home comfort—both heating and cooling—becomes more prominent in more customers' minds, with our ever-increasing living standards.

All of us in customer relations work know the value of confident answers. You can strike a big blow for liberty with the customer who is defending his pocketbook by sounding as if you know what you are talking about. These confident answers, coupled with a genuine show of interest in the customer's problem, can help cool down your customer.

Group Formed to Study Processing of A-Fuels

A GROUP, composed of five electric utilities and a chemical company, has been organized as Industrial Reprocessing Group (IRG), and proposes to undertake a study of the technical and economic feasibility of the design, construction, and operation of a privately owned facility for the processing of spent nuclear fuels.

A proposal by IRG has been submitted to the U. S. Atomic Energy Commission requesting information on AEC fuel reprocessing operations and development programs with particular emphasis on power fuel reprocessing. This proposal has been reviewed favorably by the commission staff.

Members of IRG include Commonwealth Edison Co., Consolidated Edison Co. of New York, Inc., The Detroit Edison Co., Northern States Power Co., Yankee Atomic Electric Co. and W. R. Grace & Co., Davison Chemical Division.

The study by IRG will take approximately six months and will cost an estimated $250,000. No government funds are involved. The study will be carried out under the direction of Davison.

James F. Fairman, Senior Vice President of Consolidated Edison, as spokesman for the utility companies, said that the study was an outgrowth of the desire of utility companies involved to explore the technical and economic feasibility of having their spent fuel elements processed in a privately owned facility.

The proposed study is considered a logical and necessary step in determining the over-all economics of the utilization of nuclear fuel for the central station generation of electric power.

Rural Electrification

in the United States

A NEW booklet, "Rural Electrification in the United States," which tells the story of how electricity came to the farm, is available from Edison Electric Institute, 750 Third Ave., New York 17, N. Y.

The 48-page booklet is based on the records of electric companies, electrical manufacturers and farm groups all over the nation, as well as on technical and trade journals and information compiled by agencies of the Federal government. The history of rural electrification is presented factually with emphasis on developments up to 1935.

In the first chapter, the booklet discusses the problems which faced this country in the development of rural electrification during the first decade of the 20th century. These problems were in four categories: system development, technique, population density and markets.

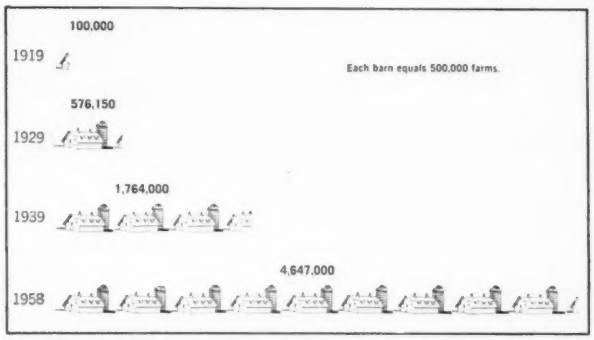
As early as the 1890's, it is noted in the chapter on Pioneer Efforts, men in the electric utility companies had become interested in taking electric service to the farmer. At that time, however, the cost of manufacturing electricity was high and farm consumption was low. By 1912, rural electrification was progressing and that year, for the first time, the U. S. Census Bureau's report of central electric light and power stations included a section on electricity in agriculture.

Era of Modern Farm Started in 1920

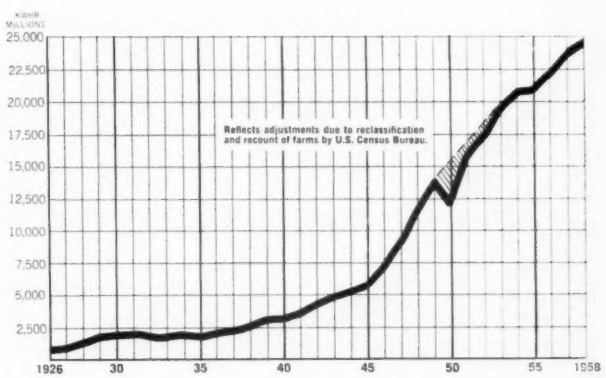
The era of the modern, mechanized farm began in 1920, the booklet reports in the chapter, A United Front. In 1919 about 100,000 farms were using electric service and by 1924 the number had more than doubled. One of the major factors in this rapid growth was the declining cost of producing electricity. During the 1920's the electric companies joined forces with other groups interested in bringing electric service to the American farmer.

The Great Depression—to which a chapter in the booklet is devoted—slowed down the expansion of electric service. When the Federal government decided that rural electrification would help a general economic revival, and began to make money available for that purpose, the electric utility companies cooperated willingly. The REA was established in 1936 as a permanent agency and as one of the many organizations which were working toward bringing electric service to the American farmer.

In A Goal Is Reached, the next chapter, it is pointed out that by 1958 some 97 percent of all farms in the country were receiving electric service and that 43 percent of these farms were served by investor-owned companies. In addition, 40 percent of the electricity being distributed by the REA was being supplied to them, at wholesale rates, by the electric companies.



Electrified farms on power lines in the United States



Farm kilowatt-hour sales—total electric industry

A series of charts in the final chapter, An Illustrated History, indicates that although the number of farms in the United States has decreased in the last several decades, the electric consumption per farm customer has steadily increased. In 1926, on the average, a farm with electric service used 2,332 kwhr of electricity a year. By 1958, the average was 5,323 kwhr, with the biggest increase coming after World War II.

"Rural Electrification in the United States" is being used by member companies for distribution to supervisors, key employees and opinion leaders. It can be used as a basis for articles, speeches and discussion sessions in employee presentations. It also can provide the backdrop for the individual company's story of its contribution to rural electrification.

The price schedule for the booklet is as follows: 1 to 9 copies, 90 cents each; 10 to 99 copies, 65 cents each; 100 to 499 copies, 50 cents each; 500 copies or more, 35 cents each. Postage is prepaid on orders of 1 to 99 copies. Orders of 100 or more are shipped FOB, New York.

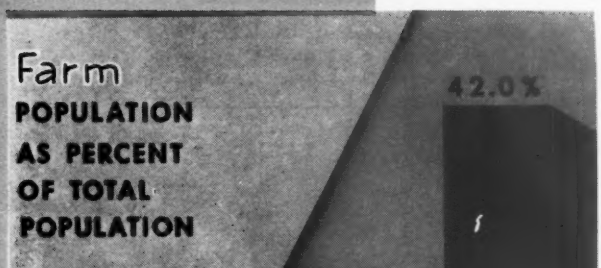


Figure 1

Figure 2

Figure 3

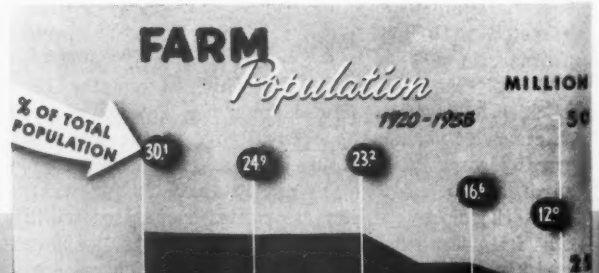
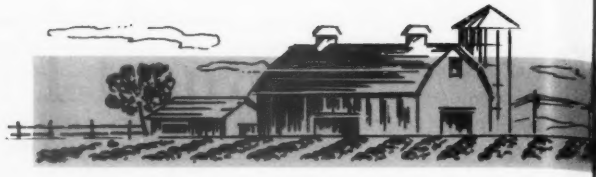


Figure 4



By Edwin Vennard*

Vice President and Managing Director
Edison Electric Institute

FARMS, farmers and agriculture have become frequent topics in our nation's press. Most of the articles about agriculture deal either with the farm surplus problem or the future of the family farm. Nearly everyone is aware of these issues.

Age-Old Problem Solved

What is generally passed over in these articles is the fact that the American farmer has succeeded in solving a problem that has plagued mankind for 600 thousand years: how to get enough to eat. There are still countries on the globe in which getting enough to fill one's stomach is a major problem—countries where starvation is a common cause of death. Fortunately, this situation is on the decline, but it is only within the last century that mankind has found the way to agricultural abundance. The American farmer led the way, backed up in his efforts by the American equipment manufacturer and the American researcher.

Our nation's farmers constitute 12 percent of the national population, (Figure 1), and they produce an abundance of food such as has never before been seen on the face of the earth.

By comparison, the Russians have 42 percent of their

*An address before the Sixth Annual National Electric Farm Power Conference, Phoenix, Ariz., Nov. 19, 1959

A Realistic Look at Farm Sales

population at work on the farms. Intelligent observers have said that the farm situation is the real key to the outcome of any future possible war. If Russia had to take many of her people off the farm, she would be running the risk of a food shortage. We are much better off in terms of food production—an important part of our nation's defense plans.

The American farmer has, indeed, found the way to outwit the spectre of starvation. The key to success in agriculture is the same key that has enabled the American workman to outproduce his foreign counterpart 16 to one—the machine. On the average, each American production worker has the equivalent of 374 helpers working for him in the form of electrically driven machines.

No wonder American factories produce about half of the world's goods, according to reliable estimates. The American farmer has been adapting the same successful ideas to agriculture with growing intensity ever since Cyrus McCormick introduced the reaper in 1831.

When industry switched over to machine production in a large way, the development was termed the Industrial Revolution. No one alive at the beginning of the period could have dreamed of the result. Now we are going through a like period in farming—an Agricultural Revolution. We can only guess at the way farming will be carried on in the future. Like any other revolution, the people involved in it are feeling the stresses of change. Some will not be able to take it; others will thrive on it. We have seen this taking shape already; the pattern of the future is fairly clear.

Let us take a look at some of the trends in agriculture, to see down the path a way. If we can, we may be able to make some predictions about electricity on the farm that might be helpful to us in our efforts.

The traditional picture of agriculture is changing. Since 1850, there has been a fairly steady rise in the acreage farmed (Figure 2). But since 1930 there has been a growing trend toward fewer and fewer farms as mechanization has taken place at an increasing rate.

The result, (Figure 3), is a dramatic upturn in size of the average farm. Until 1935, the average farm was less than a quarter-section. By 1954, average farm size had grown to 240 acres, and we know that it is substantially larger than that today—nearer a half-section than a quarter-section.

As the number of farms has dropped, so has the farm population (Figure 4). In the 20 years since 1940, the farm population as a percentage of the total has been cut in half.

This is not to say that the decrease will continue at the same rate in the future. The point is that agriculture and those in it have been going through the wringer, and the process is not yet complete. Yesterday's farmer is tomorrow's agricultural industrialist. The farm market is changing and the farm power supplier must change with it.

What does this trend mean to the farmer? For one thing, the trend toward larger farms and the trend toward mechanization have resulted in much higher capital requirements for a farming enterprise. In 1940, the investment per farm was only $8,346 (Figure 5). By 1950, capital requirements had nearly trebled, to $23,159

Figure 5

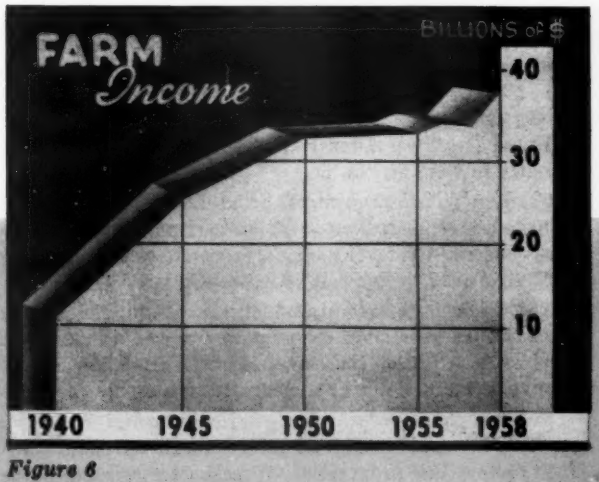


Figure 6

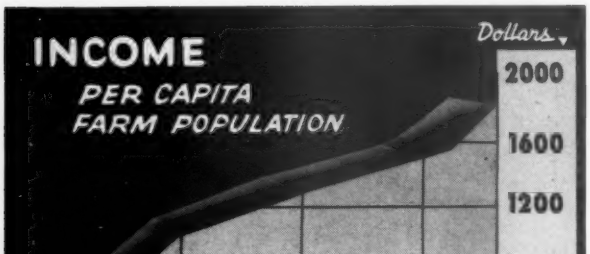


Figure 7

per farm. In 1958, the average investment was $39,314.

Dr. P. H. Stephens of the Farm Credit Bank of Wichita, Kan., estimates that by 1975, the average farm may involve an investment of $250,000 to half a million dollars.

The period of adjustment for America's farmers is not yet over. Many young people who would like to go into farming today are finding that it takes more money than they had expected.

In the field of industrial production, the company or corporation has become useful. This enables many people to pool their savings to invest in the machinery of production. With the coming high investment in farm machinery, will we follow a similar procedure in our farm production? Will there be professional "farm managers" operating "farm companies" as we now have "business managers" operating business concerns?

While farm investment has risen, so also has the gross income realized by farmers. Farm income stood at $11 billion in 1940. Eighteen years later it had more than trebled; it was $38 billion in 1958 (Figure 6).

In terms of net income as a percent of investment, the farmer is not as well off as he has been in years past.

He is making about 7 percent on his investment before any provision for wages for himself. But let's not be fooled by averages. Some farmers are doing very well; others are being forced out of business.

There are fewer farmers and they are relatively more productive than in the past.

Farm population dropped from about 30 million in 1940 to about 20 million in 1958. During the same time, gross income per capita of farm population grew from $361 to $1,839, a five-fold increase (Figure 7).

This shows the results of higher production due to mechanization and lower manpower needs. In terms of total cash received, the rewards of farming have never been so great; neither, apparently, have the problems.

For the past several years, agriculture has been in a state of internal turmoil as the conversion from farm to food factory has progressed. Wracked by growing pains, the farmer has been squeezed relentlessly in the direction of mechanization. Formerly, the cheapest way to get something done was for the farmer or one of his family to do it himself. Now, for many tasks, the farmer cannot afford to let anyone do them by hand. This is particularly true in the handling of agricultural materials.

Mechanization means that the farmer can get more work done and produce more food. By so doing he earns more. What he earns is a combination of administrator's salary, wages for manual labor and return on his investment. The more he is mechanized, the more valuable his time becomes in each of those categories. The more his time is worth, the more he must continue to mechanize, both to conserve his time and to get most use out of his existing investment.

Because he has a good deal of capital tied up in his farm, the farmer must get the best possible yield from every farming operation. If environmental control can raise his production, he is a prospect for it. Where the cost of a heat pump installation 10 or 20 years ago would have equalled the value of the farm, today it amounts only to a modest increase in investment which may be more than offset by greater output through environmental control. Applications out of the question a few years ago are becoming necessities today. The trend will be in this direction in the future.

What does this mean to the power supplier? It most certainly means added load and greater opportunity to serve farm customers. The power supplier who is privileged to serve American farms is an eager partner in one of the most exciting and meaningful developments of our time. Any time any American wants to do anything bigger or better, his electric power supplier—whether it is a company or a cooperative—will be standing by ready to help in any way possible. It is this spirit that has built America.

The power companies have a keen interest in bringing more of the benefits of electrification to America's farms. Power companies are participating in 222 research projects covering 87 topics. In addition, there are some 400 other company-sponsored activities aimed toward more effective use of electric service on the farm, better land use, livestock and poultry improvement, farm community improvement, as well as rural youth development programs carried on, either in part or as a whole, by power companies. These companies are investing both manhours and dollars in the future of America's farms—and a bright future it is.

Growth and Change

Edison Electric Institute calculations indicate that by 1980 the total electric industry will be producing 2.8 trillion kwhr, compared to 1959's 707 billion. This is a compound annual growth rate of 7.5 percent. Compare this with the growth in domestic* kwhr from 184 billion kwhr in 1959 to 920 billion kwhr in 1980, representing a growth rate of 8 percent.

America's rural power suppliers look forward eagerly to this growth. The big investment involved in bringing service to individual customers is now largely completed. The task from now on is to increase utilization of farm service. We know that on a per-unit basis, costs will drop as we do so. We already have the pole lines,

* Residential and rural.

the rights-of-way, the substations. Greater use will not involve greater expense in direct ratio.

Ebasco Services, a consulting firm of considerable reputation, some time ago made a study of this factor for a client. The study showed that when load densities on the client's system were increased eight times, the capital costs per kva for the added investment in the transmission and distribution systems dropped 18.5 percent.

There will, likewise, be potential reductions in incremental expenses. Newer plants generally operate at better heat rates. Base-loading the new plant increases the gain from higher efficiency. Larger loads permit us to go to larger-sized units for further operating economies.

A good many of our expenses will not be affected by increased use. It costs no more, for example, to have a meterman read a meter showing 500 kwhr than to have him read one which shows 50 kwhr. It costs no more to make a sales call on a 20,000-kwhr farm than on a 5,000-kwhr farm. Any expense item that is not demand- or energy-related will offer the opportunity of cutting costs per kilowatt-hour with greater sales.

Of course, any added load that is directly on the system peak, without the offsetting off-peak load will tend to lower load factor and thus impair the supplier's economic position. Farm load is good load, but some of it is better than some other. We will discuss particular applications later.

The decision to promote an application should give consideration to the value of the service to the farmer. It is to our advantage, as well as to the farmer's, to put electric power right where it is needed. It is unwise and short-sighted to sell the farmer anything he does not want or need. This makes enemies and will hinder rather than advance electrification of the farm.

On the other hand, wise promotion of helpful devices can better the farmer's position as well as add to our load. At the same time, we should not overlook any ways to help improve load factor. We owe it to our customers to help them keep their load factors up because this helps keep the price of electricity low.

One of the Institute's member companies, Otter Tail Power Co., with headquarters in Fergus Falls, Minn., reports on an interesting example of benefiting the farmer through electrification. It carried on irrigation comparison tests which showed the value of irrigation in terms of farm production. Generally, in the areas where tests were conducted, irrigation raised per-acre yields many-fold.

On one of the farms, 18.8 inches of water were pumped onto the fields in 1959. The pumping required 47,120 kilowatt-hours of electricity. Extending service to supply the irrigation facilities cost Otter Tail $1,178 on one farm and $1,600 on another.

Where there is irrigation, farmers tend to change from a cash grain program to a more varied program involving livestock and dairying. This generally means a change from growing crops which are in surplus to those that find a ready market.

The livestock and dairy farmer is a much better electric customer than the cash grain farmer. In addition, irrigation farmers need added goods and services—fertilizers, machinery, extra help—that give the area's economy a shot in the arm. As the area prospers, so does the power supplier.

This is a good example of promoting a use of electricity that can benefit everyone. There are others that will produce such benefits in varying degree. We must look for them and foster them.

No one can study the recent history of agriculture without being impressed by the startling changes that have taken place and are taking place today. Where the farmer was once a small customer, he may today be using many thousands of kilowatt-hours. Despite this change in the market potential in the farm class, we find that many power suppliers still use the same sales methods they were using at the end of World War II.

But the market has changed. We no longer have to seek out the few farmers who might be prospects for a certain kind of electrical equipment. There are today enough such prospects that we can use mass selling techniques. The farmers themselves are shrewdly assessing the value of these same applications. They are eager to learn about them.

There are three approaches to a market of this kind: one is through national media, one through local and area media, and the third is the individual approach. We should be thinking in terms of combining national and area-wide advertising with local promotional efforts to get the greatest value out of our farm sales dollar.

Electricity is a clean, quiet, versatile, efficient and flexible source of power. Electricity can do jobs the farmer couldn't get done at all before. Let us find out what will most help our farmers and design appliances with that in mind. There is a definite limit to our future market in the farm field if we are going to continue to pin our sales hopes on changing existing devices over to electricity. Future load growth in the farm market will depend on our ingenuity in finding new ways to help the farmer.

Farm Load Patterns

While we are working on new products to help the farmer, let us bear in mind the effect that use of those applications will have on the farm load curve, for it is this that will, in the final analysis, determine the price of electricity to the farmer. When load factor is low, utilization of the investment is low and therefore per-unit costs are higher. No enterprise can last very long if its costs exceed the price.

Farm load has doubled in the last eight years. With new applications coming into play, it is possible that in the next eight years the shape of the farm load curve may be entirely different. The wise power supplier will keep a careful eye on this curve and be prepared to take counter measures should it begin to get out of balance.

The load of the average farm today is mostly residential, but there is a growth potential in food factory applications that could cause a drastic reversal of this situation. Tomorrow, fairness may dictate that rates be altered as the farmer uses more electricity for business purposes and less for residential purposes. Perhaps a demand-energy rate may become more appropriate. Whatever the case, rates to farm customers, like rates to other customers, should always cover the costs of furnishing service to them.

Let us look at the load curve of farm applications—the load resulting from electric chore appliances and other applications not used in the farm home.

This load has two peaks that are about equal. One occurs in the mid-morning. Load drops off around the lunch hour, then peaks up again in mid-afternoon. It drops again with the approach of the dinner hour. Compared to other load curves, farm loads come on rather early in the day and drop off fairly quickly at night.

The man who has studied many system load curves knows that this is good load. It fills valleys in the typical system load curve. It drops off during the hours the system is peaking.

Use in the farm home follows a different pattern. It peaks at the noon hour and again during the dinner hour. It tends to stay on the lines later in the evening.

The curve formed by the farm and home loads together is much better in terms of load balancing than either of the loads taken alone (Figure 8).

With the farm load superimposed on top of the system load, farm sales tend to balance the load, fill the valleys and build load factor. Of course, where farm use falls on the peak, the effect on load factor is adverse. This is the case with the farmer's use of the electric range. The farm range peak occurs at the time of system peak. But for every other hour, farm load enables the supplier to make use of generating equipment which would otherwise be idle. This is good load. The range should be pushed, but we should balance it with offsetting loads such as the water heaters.

Farm use of kilowatt-hours has grown, both for chores and for home purposes. The farmer has become a big customer and he will grow even larger as time goes on. We are working in an area that offers good load to the supplier. By working with the farmer and using a little foresight, we can insure that this load grows better as it grows larger, in terms of what it does to improve system load factor.

The power supplier must judge whether the large-use farm is to continue to be billed the same as one whose use is mainly residential in purpose. In addition to the question of whether an automated food factory is on a par with a rural home, there is the question of fairness.

Where rates do not embody a demand element, the high-load-factor, high-use customer is generally paying part of the electric bill of the low-load-factor customers. Perhaps it is time for us to be looking into the two-part rate so that we can continue to give the helpful, desirable customer the break he deserves. Whenever a demand feature is added to an existing rate, it should be designed not to give a penalty for poor load factor when the demand meter is installed, but rather a possible discount for good load factor.

Competition and Pricing to Meet It

As the farmer becomes a larger customer, his rate becomes more important. It is important in the matter of meeting competition. We are all aware that competition from other forms of energy is as stiff in farm sales as in any class of use. We are getting some help in meeting that competition from the relative costs of the various sources of energy.

The retail price index of various fuels compared with electricity shows that while the prices of fuels have jumped rather sharply, the increase in electric rates has been very slight indeed—much less than the rise in cost of living over the same period.

What has kept electricity prices down? Several factors enter into it. One is that there have been engineering economies. Another is the opportunity to cut per-unit expenses by raising load densities. Another is going to larger sized units and higher transmission voltages to get greater efficiency. Yet another is the gradual improvement in load factor that has been taking place through the years.

Each of these avenues remains open to us in the future. Two of them depend upon power sales people: selling to build load factor, and building volume to justify large-scale operation.

If we can keep the price of electricity low and if the costs of competitive energy sources continue to climb, then at some future time electricity will be cheaper for all purposes. Then you may expect to see a spurt in sales that will be little short of fantastic. The possibilities dazzle the imagination of even the most farsighted dreamer.

Customer's Knowledge of Low Rates

Rates are important. They are the measure of our competitive position compared to other forms of energy. But electric rates can have little meaning unless the customer knows what they are and thinks they are fair. This is particularly important in the case of the farm customer because of the great kilowatt-hour potential that is to be found on most farms. Right now, use in the farm home is the bulk of the use on the average farm, but it will not always be this way.

Economic laws are forcing the farmer to mechanize, and electricity is the best source of energy for this purpose.

As we go out to sell our farm customer, let us at the same time sell our rates. Get the farmer to understand how electricity is priced, and give him the means by which he can roughly figure the cost of running a piece of electrified equipment. It usually comes out in pennies, and he is impressed.

The rates themselves should be so designed that no matter what the customer's use or demand there is always a juicy carrot dangling just ahead of the customer. Make it worth his while to electrify. Sell the customer on the rates. A customer who thinks well of the rates is likely to be a firm friend of the supplier. He is also presold on the use of more electricity.

Rate design is an area where the various kinds of suppliers of rural electricity can work together. There are many others, and there will likely be big advantages in exploiting them fully.

Obviously, there are differences between REA cooperatives and power companies. These differences are largely in the tax treatment and method of financing. But there are many areas in which we have a common interest.

The principal area of common interest is in the field of sales. Let us try to expand our working together in this field. There is much to be done in research, planning, promotion and advertising where we can help each other and the farm customers.

After we have established a close working relationship in sales, let us try to extend our efforts in cooperation into other fields of utility operation.

In the Institute we have the Farm Better Electrically Program which is part of the Live Better Electrically promotion in which participating companies have pledged some $2½ million to acquaint Americans with the benefits of electricity. The program has received wholehearted cooperation from manufacturers, and the total impact promises to build residential load to new highs.

Farm Better Electrically will help stabilize the farm economy by bringing each of America's farmers more of the benefits of electricity.

Electrification will cut his labor cost and increase both the quantity and quality of his product.

To show the importance we place on this activity, the proposed 1960 budget for Farm Better Electrically is triple the 1959 budget figure. For every dollar of the Farm Better Electrically budget, sales allies will spend three dollars in supporting advertising.

Building System Load Factor

Selling to build load factor is a science that involves more than the sales department. It requires a study of the system load curve and an analysis of the load characteristics of the various applications of electricity. System load curves of suppliers serving rural markets may vary widely. The task is, of course, to fill in the valleys without materially adding to the peaks. Exactly where the peaks and valleys occur, and their size, will vary from system to system.

Building load factor is just as much a concern of the cooperative that purchases all of its power, as of the generating utility. From the point of view of either the buyer or the seller, the price must be related to the cost of making the electricity. As we have seen, load factor has a heavy influence on the cost of making power. The cooperative that uses electricity during attractive hours costs less to serve, and the price will reflect it. This can affect the cooperative's net margin and also the rates at which it can sell power to its customers.

How can we sell to build load factor? First of all, we must remember that the farmer uses electricity both for farm applications and for home applications. He has electric-powered chore machinery and he has household appliances. Let us see how saturation in chore equipment and household appliances might look for a system in the Midwest (Figures 9, 10).

The four leaders are water system, refrigerators, washing machines, and milking machines, followed closely by television.

Of course, these saturations will be different as we move to different areas of the country. In the West, irrigation pumping accounts for a large number of kilowatthours. In 1958, average use on the farm in the East was 4,428 kwhr, while in the West it was 8,435.

Irrigation is the principal cause of the difference.

Figure 8

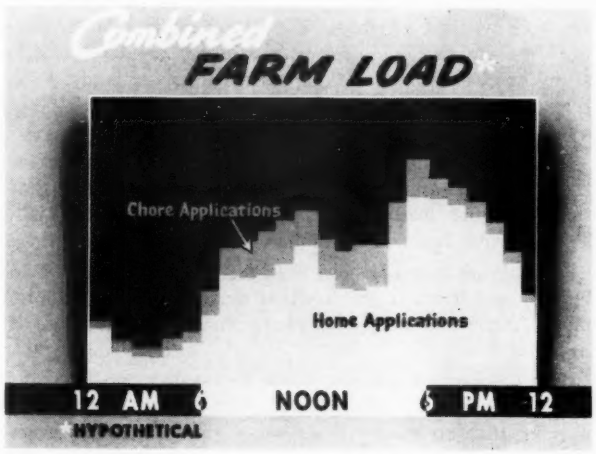


Figure 9

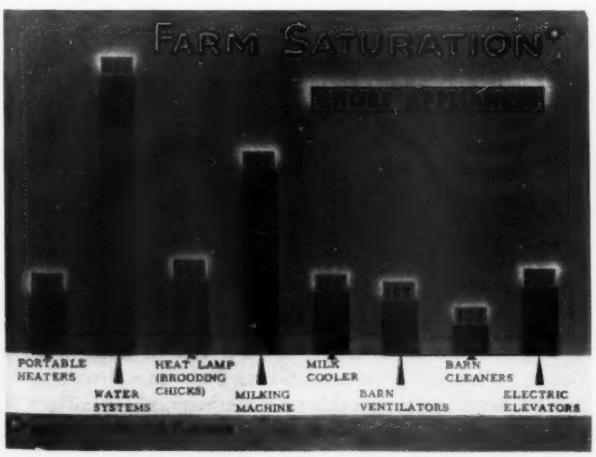


Figure 10

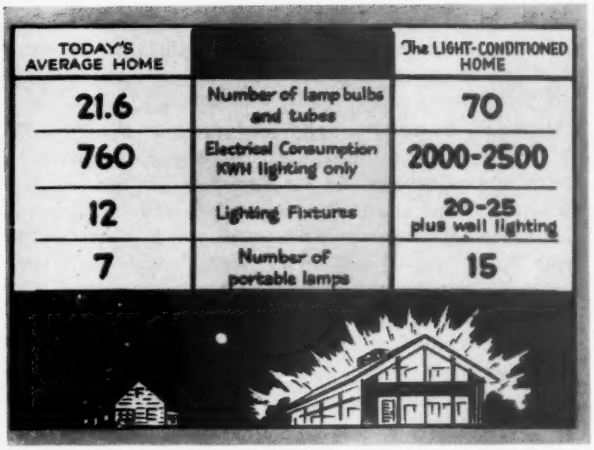


Figure 11

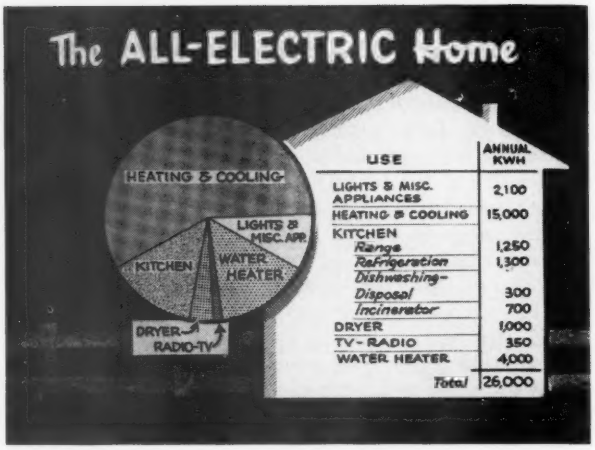


Figure 12

There is a decided difference in the appliance saturation and the use of the cash grain farmer, for instance, as opposed to the dairy farmer. The point is that each system should keep a close eye on saturation and usage developments in its area and for the kind of farming that goes on there. This is an area in which some joint research would be helpful. Despite the farmer's increasing importance as a power customer, relatively little study has been made of farm saturations and loads. Both companies and cooperatives could profit by learning more about load conditions on farms in their areas.

Wherever located, farm home use generally resembles the residential load curve. Generally speaking, loads that tend to build load factor in the residential class will also improve farm load factor.

One of the best of these is lighting. It is a good load builder and there is an excellent market for it. Indoors, most Americans must get along on 20 foot-candles of light, or less.

But the human eye was made for seeing outdoors under 500, 1,000, or even 10,000 foot-candles. Is it any wonder that so many of us wear glasses? An average home has about 22 lamp bulbs or tubes. A light-conditioned home has 70. The average home uses 760 kwhr a year for lighting, while a light-conditioned home would use 2,000 to 2,500 (Figure 11). In lighting fixtures and in portable lamps as well, today's home is far below what it should be. We have no reliable figures on the kind of lighting found on today's farms, but there is reason to suspect that farm lighting may not have reached the levels of urban residential lighting as yet. This is an area of farm sales that is worth exploring.

Of course, refrigeration is a big load builder. The refrigerator comes on and goes off at intervals throughout the day and night, and will aid in improving load factor. Certainly every farm home should have a refrigerator, and most all of them do. But now there is a more useful device on the market—the refrigerator-freezer. We should not be content until every farm home has one of these. It will use from 600 to 900 kwhr annually as compared to 300 for the conventional refrigerator. In addition, it will save time and steps for the farm housewife. It is another move forward in raising the standard of living and conserving human energy for higher tasks.

The third best builder of net revenue and percent margin is the freezer. This is not a luxury but an economy, especially on the farm. Every farm home should have one. There is no need for elaboration on the benefits of this appliance to the farm home.

It is important to keep a check on the balance between water heaters and ranges. Our sales efforts should lead us in the direction of a favorable balance between these two loads. Studies show that we should be selling one water heater for each two ranges sold, on the average.

Every bed should have an electric blanket or an electric sheet. This is the purest of off-peak loads.

As the American standard of living has risen, Americans have sought more of the creature comforts. This trend has resulted in the wide popularity of room coolers and other air conditioning equipment. While these devices tend to build load factor in a winter peak situation, they have overbalanced the winter load in the Southwest, producing a summer peak. This summer peak situation is spreading. In a summer peak situation, cooling equipment hurts load factor. There is a way it can be balanced out, however—conversion to year 'round climate control. This includes electrical heating during the winter as well as humidity control summer and winter.

We have a long way to go in raising the use of electricity in the farm home. There is every reason why the farm home should be an all-electric home, using 26,000 kilowatt-hours in addition to the use of electricity for chores (Figure 12).

Possibilities for load-building in the farm home are great, as are possibilities in general farm electrification.

The Role of Electric Power Supplier

We are here because we are managers of electric power enterprises. As such, our job is to utilize our people and our resources in such a way as to get electricity to our customers in the most economical and efficient manner. Economics, like mathematics, is unaffected by the system used. There is a best way of doing everything. Whether government-owned or non-government-owned, whether cooperative or company, the aim of the

(*Continued on page* 30)

Prime Movers Committee Meeting

- *New Chairman; Committee Reorganization*
- *Metallurgy and Piping Task Force Report*
- *Research Programs of the Committee*

T. O. THOMPSON
Chairman

THE Prime Movers Committee returned to the Carolinas after 17 meetings during a five-and-a-half year period in other sections of the country to hold its 98th meeting in Charlotte, N. C. The 100-man committee met at the Hotel Wm. R. Barringer for a three-day session beginning on Oct. 12. The meeting was highlighted by the customary round table agenda of well over 100 topics, subcommittee and task force reports, and reviews of research projects and activities in which Prime Movers Committee members have an interest.

First Meeting of Year

Since this was the committee's first meeting of the 1959-1960 committee year, the sessions were presided over by a new slate of officers. T. O. Thompson, Vice Chairman for the past two years, has succeeded V. L. Stone as Chairman, with C. A. Dauber assuming the Vice Chairmanship for the current season. The membership of the Committee's Executive Group remains essentially the same, consisting of, in addition to the officers, V. F. Estcourt, Chairman, Turbines and Condensers Subcommittee; R. A. Baker, Chairman, Boilers & Combustion Subcommittee; V. L. Stone, immediate Past Chairman; J. M. Driscoll, Past Chairman prior to Mr. Stone; R. M. McCumber, Member-at-Large, and H. G. Hiebeler, Member-at-Large. The only change in the Executive Group membership resulted from a continuation of the practice of including the two immediate past chairmen, with W. L. Chadwick, whose tenure preceded Mr. Driscoll's and who is now Chairman of the Engineering & Operating Division Executive Committee, retiring.

The annual reorganization of the main committee during the past summer added Messrs. G. W. Bice, American Electric Power Service Corp.; I. B. Dick, Consolidated Edison Co. of New York, Inc.; W. F. Nelson, Wisconsin Public Service Corp.; F. E. Nicoson, Public Service Co. of Indiana; A. C. Pasini, The Detroit Edison Co.; E. D. Powell, Duke Power Co.; F. A. Ritchings, Ebasco Services, Inc.; A. A. Vail, Public Service Co. of Colorado; W. L. Wingert, The Detroit Edison Co., and W. A. Zitlau, San Diego Gas & Electric Co., to the committee's roster.

As the committee's meeting procedure has evolved over the years in keeping with the interests of its members, increasing emphasis has been directed to the informal discussion of power station operating and design problems. By organizing the large group into 14 subcommittees and a task force, and by assigning special activities to a number of individual members, meeting time required for project consideration has been substantially reduced. This arrangement allows expeditious committee action on subgroup or sponsor recommendations with details of the individual activities being developed in subcommittee meetings. A recent survey of the committee by Mr. Dauber on the conduct of meetings confirmed general approval of present practice under which the first day, the morning of the second day, and the remainder of the third day after approximately two hours of project reports and discussion, are occupied by round table discussion. The afternoon of the second day is customarily reserved for field trips.

Round Table Discussion

The Oct. 12 morning session was opened by a welcome from O. J. Miller, Executive Vice President, Duke Power Co. Mr. Miller described his company's system and briefly discussed a number of welfare programs the company has instituted for its 6,000 employees. Following Mr. Miller's remarks, the first day was devoted to round table discussion under the direction of the vice chairman.

The Atomic Power Subcommittee sponsored a review of the status of atomic projects underway or being planned by companies represented on the committee. F. F. Mautz, substituting for J. N. Landis, Chairman of this subcommittee, called on Messrs. Kirschner, Barthelemy, Wingert, Hotchkiss and Parrish who reported on recent developments in the Yankee, Pathfinder, Enrico Fermi, Santa Susana and Shippingport atomic power programs. Mr. Mautz reported on the Humboldt Bay atomic power unit.

The Prime Movers Committee closely follows developments of interest to the industry in the field of air pollution through its Air Pollution Subcommittee. At the request of W. C. Beattie, Chairman of this group, A. C. Pasini reported on recent activities of several technical organizations concerned with this problem. Mr. Pasini urged continuing awareness of this subject by the industry in view of the rapidity of developments at the present time.

Boilers, Combustion Subcommittee

R. A. Baker, Chairman of the Boilers and Combustion Subcommittee, reported that because the number and intensity of furnace explosions appear to be increasing, the subcommittee has deferred work on other projects to concentrate attention on this problem. Mr. Baker's group is working in conjunction with the Station Instruments and Controls Subcommittee in this study.

The Fuel and Ash Handling Subcommittee is directing attention to the subject of power station coal handling. Mr. Engle reported that a recent questionnaire to committee members will provide information on practices and equipment currently in use. The subcommittee is also continuing its consideration of the disposition and utilization of fly ash.

In reporting on the activities of the Metallurgy and Piping Task Force, E. H. Krieg described progress being made by the ASTM-ASME Joint Committee on the Effect of Temperature on the Properties of Metals research

program, on the use of austenitic steel for steam line service and austenitic stainless steel in superheater tube service under the direction of Dr. J. W. Freeman of the Research Institute, University of Michigan. Dr. Freeman is Metallurgical Consultant for the Prime Movers Committee. On recommendation of the committee, EEI has contributed to this research work. Mr. Krieg also reported on the status of the rewriting of Power Piping Section I of the ASME Code for Pressure Piping which is being done with financial support from EEI.

The increasing number of requests being received by individual electric utility companies to contribute to research programs of a metallurgical nature sponsored by a number of technical organizations prompted the task force to suggest to officers of several groups that consideration be given to discontinuing the numerous appeals by individual project groups to a number of companies in lieu of a general solicitation to the EEI.

I. B. Dick, Chairman of the Power Station Chemistry Subcommittee, summarized the subcommittee's Sept. 28-30 meeting in Salt Lake City, Utah. These sessions were attended by 52 members and 14 guests.

Following an address by E. M. Naughton, President and General Manager, Utah Power & Light Co., the chairmen of the various subcommittee sections advised of the status of their work. Subjects on which section reports were presented include corrosion, water treatment, stream pollution, air pollution, by-product utilization, carryover and furnace chemistry. The subcommittee's next meeting is scheduled for April 11-13, 1960, in Philadelphia, Pa.

F. F. Mautz reported that the Power Station Structures and Facilities Subcommittee of which he is Chairman had been asked by the Executive Group to investigate problems associated with concrete chimneys. Deterioration of concrete stacks is a matter of increasing concern to power station operators.

The report of the Station Instruments and Controls Subcommittee was presented by W. W. Welch, Jr., Chairman of this group. The subcommittee is following the experience and status of several power plant automation programs recently completed or underway. The subcommittee is also turning its attention to studies of turbine supervisory instruments, furnace flame detectors, and boiler water level indicators.

V. F. Estcourt, Chairman of the Turbines and Condensers Subcommittee, called attention to the results of a subcommittee study on the subject of rate of load pickup made available to the committee since its last meeting. The subcommittee is currently working on a questionnaire on practices with regard to overnight and weekend shutdowns and their possible correlation with case cracking problems. The subcommittee is also planning to investigate practices of companies represented on the committee in connection with the peak load capacity of turbine generator units.

Prime Movers Committee members engaged in research programs of interest to the committee include G. W. Bice, who reported on the status of the ASME High Temperature Steam Project; A. C. Pasini, who advised of developments in the ASME Extension of Steam Tables Program, and R. A. Baker, EEI Representative on the ASTM-ASME Joint Committee on the Effect of Temperature on the Properties of Metals. T. M. Hotchkiss, who with P. H. Hartung represents the Prime Movers Committee on the Bituminous Coal Research, Inc.-EEI-AEIC Joint Research Advisory Committee steering the research work underway at BCR on sulphur removal from coal and flue gas contaminants control, also reported on the progress of this program.

The committee's next meeting will be held in Cleveland, Ohio, February 1-3, 1960.

Richard B. Curran

RICHARD B. CURRAN, Financial Vice President of The Hartford Electric Light Co., died Nov. 30 at Hartford Hospital after a brief illness. He was 64 years old.

Following his graduation from New London Business College, Mr. Curran was employed by the Babcock Printing Press of that city for three years. He joined The Connecticut Power Co. in 1914.

After two years in the utility's billing department and two years as office manager of the Middletown division and chief clerk of the Canaan office, he returned to New London in 1918 as the company's chief clerk. He was promoted to assistant secretary in 1922 and was made secretary in 1924. He was elected secretary-treasurer of Connecticut Power in 1933 and financial vice president in 1946.

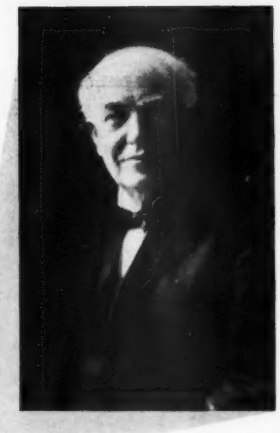
In 1947 Mr. Curran was elected vice president of The Hartford Electric Light Co., succeeding that company's chief financial officer.

When Connecticut Power was merged with Hartford Electric Light in 1958, he became financial vice president of the merged companies.

His various duties in both companies gave Mr. Curran wide acquaintanceship in all their divisions throughout the state. He was widely regarded as one of the ablest and best-liked people in the utility.

In New London he was active in Community Chest work and served as chairman of that organization's budget committee. He was a member for a number of years and a director of the Diocesan Bureau of Social Service. He was a trustee of Chapman Technical High School and formerly a director of the Union Bank and Trust Company of New London.

Mr. Curran was a member of the Hartford Club, Hartford, and of the Thames Club and BPOE in New London. He was a former member and treasurer of the New London Rotary Club.



Science Youth Day to Honor Edison

THE fourth annual Science Youth Day, honoring the 113th birthday anniversary of Thomas A. Edison, will be celebrated Feb. 11, Walker L. Cisler, President of The Detroit Edison Co., and Chairman of the International Edison Birthday Celebration, has announced.

The purpose of the program is to interest more junior and senior high school students in science and engineering careers and to stimulate active public interest in effective science education, and wider acquaintance with science and technology. The program is under the auspices of the Thomas Alva Edison Foundation.

This year 300 American corporations will participate in Science Youth Day activities in cooperation with local school systems.

Describing the purposes of the celebration, Mr. Cisler said: "Today, as never before, we must encourage young people toward top achievement in all fields. In science and technology the name of Thomas A. Edison carries a legacy of inspiration for all students. We hope that on Science Youth Day many thousands will gain an accurate concept of what careers in scientific engineering and technological fields may offer them."

Mr. Cisler said that in its first three years the participation by industry of all kinds had grown well over 200 companies in every part of the nation. These companies invite more than 150,000 local high school students to visit company plants and research laboratories to meet and talk with scientists and engineers. Industrial scientists also appear at local high schools on Edison's birthday for special lectures, demonstrations and assembly programs.

"The great proliferation of scientific and technological advances today requires continuing efforts to bring industry, research and education closer together," Mr. Cisler said. "The unending efforts of devoted teachers in our schools should be backed up by full cooperation from industry. Only in this way can we all be assured that we are preparing tomorrow's leaders for responsibility in an age of science."

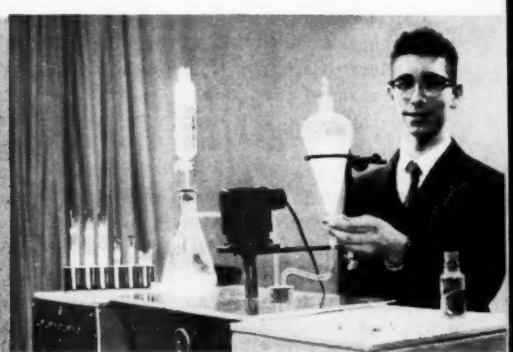
Last year many companies inaugurated special Science Youth Day contests and other programs as new aspects of their educational relations activities. Some examples are: student science project competitions; essay contests about Edison, science and invention; establishment of local scholarships awarded to students winning such contests.

Companies also conducted student visits to their plants and laboratories, distributed copies of the Edison experiments pamphlets printed by the Edison Birthday Celebration Committee and placed special newspaper, television and radio advertising promoting Science Youth Day, as well as National Electrical Week.

In addition to participation by private industries, the U. S. Atomic Energy Commission will open the nonclassified areas of 11 installations to high school students on Edison's birthday.

More than 16,000 high school science clubs are being asked to highlight this day by arranging special science activities. A broad public information program is being organized to include major articles in national publications and programs on network television and radio

(*Continued on page* 30)



People in Power

EMORY P. BAILEY, Vice President and Manager of Granite State Electric Co., has been elected President of the utility. He succeeds ANTHONY C. BENJES, retired.

Mr. Bailey was graduated from the University of Maine with a degree in electrical engineering. Following graduation, he joined the New England Electric System, parent company of Granite State Electric, as a student engineer at Lowell, Mass. Later he transferred to Rhode Island where he became area manager in 1937.

During World War II, Mr. Bailey served as a lieutenant commander in the U. S. Navy. After the war he was named assistant manager and then manager and vice president at Weymouth, Mass.

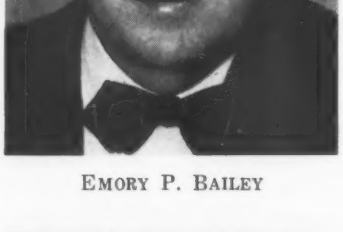
In 1957, Mr. Bailey was named to an executive position with the Yankee Atomic Electric Co. in Boston. About a year later he was elected vice president and manager of Granite State Electric.

D. BRUCE MANSFIELD, General Counsel of Ohio Edison Co., has been elected Executive Vice President of the utility and ED. F. DISSMEYER, in Charge of Production and Transmission, was elected a Vice President, two new offices created by Edison's board of directors.

JOHN R. WHITE was appointed Senior Attorney and will be in charge of the company's Legal Department.

Mr. Mansfield joined Ohio Edison as general counsel in 1948. He is a graduate of Kenyon College and holds a bachelor of laws degree from Duke University and the degree of doctor of jurisprudence from Yale Law School. From 1938 to 1940 Mr. Mansfield was an attorney with the Securities and Exchange Commission in Washington. In 1941 he became a member of the law firm of Amerman, Mills, Mills, Jones & Mansfield of Canton, Ohio, where he remained for seven years before becoming associated with Ohio Edison. He was Chairman of the EEI Legal Committee from 1954 to 1956. He is a member of the Legal Committee at present, and has been a member of this Committee since its formation.

EMORY P. BAILEY



D. BRUCE MANSFIELD

Mr. Dissmeyer, an electrical engineering graduate of the University of Nebraska, has been associated with Ohio Edison and predecessor affiliated companies for more than 30 years. He was named Edison's chief engineer in 1952. In 1958 he was delegated to handle special engineering and operating assignments for the company and in 1959 was placed in charge of production and transmission.

Mr. White joined Edison's Legal Department in 1953. He is a graduate of the University of Michigan Law School. Following several years of general practice in Akron, he served for more than 3½ years as assistant law director of the City of Akron.

GEORGE W. O'CONNOR and WILLIAM W. TALBOTT have been elected Vice Presidents of The Montana Power Co. They will assume the duties of C. J. BURNS, Senior Vice President, who has retired, in addition to continuing in their former capacities. Mr. O'Connor will continue working in customer and community relations. He will take over Mr. Burns' jobs of labor negotiations, direction of the utility's state-wide safety plan and special executive assignments.

Mr. Talbott will continue as general sales manager. He also will assume Mr. Burns' duties of directing commercial, residential and industrial sales and industrial development, personnel and policy matters concerning employees' welfare in the fields of workmen's compensation, group life insurance and special executive assignments.

Mr. O'Connor joined Montana Power in 1957. Prior to that time, he was associated with the gas pipelines construction business and was a merchant and rancher. Mr. Talbott has been with the company since 1931. He came to the Butte office last year as executive assistant and then was promoted to general sales manager.

KENNETH W. HASBROUCK, Assistant Vice President, New York State Electric & Gas Corp., has been elected Vice President of the company.

In his new post, Mr. Hasbrouck, Chairman of the EEI Rate Research Committee, will continue to be in charge of the company's rate and regulatory matters, the responsibilities he assumed last February.

In the past 27 years, he has been in charge of the preparation of rate and special contract filings with the Public Service Commission and has testified before the PSC and the Federal Power Commission in cases relating to rates and franchises.

Mr. Hasbrouck was graduated from Rensselaer Polytechnic Institute in 1926 with an electrical engineering degree. He joined the company a month later as a cadet at Oneonta.

In 1930, he became assistant to the vice president and general manager with headquarters in Oneonta. He

was made assistant to the division manager in Geneva in 1931 and returned to Oneonta in 1932 as assistant to vice president in charge of regulatory matters. He served in that capacity until 1959, when he was made assistant vice president.

CARROLL H. WALSH, Arkansas Power and Light Co. Chief Engineer, Pine Bluff, was elected Vice President of the company.

Mr. Walsh, a veteran of more than 32 years of AP&L service, will be responsible for the engineering and other activities now under his supervision. He began his power company career in 1927 as an assistant engineer. He is a graduate of the Crossett public schools, and received a degree in electrical engineering from the University of Arkansas the same year he joined AP&L. In 1938 he was promoted to electrical engineer. He was named assistant chief engineer in 1956 and two years later, chief engineer.

He is a member of the American Institute of Electrical Engineers and American Society of Professional Engineers. In addition, he is a member of Tau Beta Pi, honorary engineering fraternity.

N. J. MACDONALD, of Elizabeth, N. J., President of The Thomas & Betts Co., was elected President of the National Electrical Manufacturers Association at the closing session of NEMA's 33rd annual convention in Atlantic City, N. J.

Mr. MacDonald, a vice president of the Association, succeeds J. L. Singleton, of Milwaukee, Wis., Senior Vice President, Industries Group, Allis-Chalmers Manufacturing Co.

KARL H. RUDOLPH, Controller, The Cleveland Electric Illuminating Co., has been elected Vice President-Marketing of the company.

Mr. Rudolph joined the Illuminating Co. in 1942 as an accountant in the methods department and became department manager a year later. He has served as staff assistant to the president, manager of the performance analysis and budget department and manager of the financial analysis and rates department. As controller he was also in charge of the company's financial controls department.

Mr. Rudolph succeeds ROBERT C. HEINTON, who was elected to the newly created position of Vice President in the marketing group. Mr. Heinton joined the Illuminating Co. 32 years ago as a salesman. He now will specialize in promoting long-range territorial development and planning. He also will handle major marketing projects and will serve as consultant to the marketing group. He became general sales manager of the company in 1949 and in 1953 was elected vice president-marketing.

WALKER L. CISLER, President of The Detroit Edison Co., has assumed the Presidency of the American Society of Mechanical Engineers.

He was elected to head the 48,000-member professional organization at the annual meeting of the society, held recently in Atlantic City.

Mr. Cisler is the third Detroit Edison president to hold office as head of ASME. The other two were the late Alex Dow, who served in 1928, and the late James W. Parker, who led the group in 1942.

HAROLD C. LEONARD, Executive Vice President in Charge of Louisiana Operations of Gulf States Utilities Co., has retired after 40 years of service with the company.

HAROLD E. BROWN, Baton Rouge Division Manager, has been elected Vice President of the power company.

Mr. Leonard began his utility career in Boston in 1919 after receiving electrical engineering degrees from Worcester Polytechnic Institute and Union College.

Mr. Leonard worked for several years with Virginia Electric & Power Co. From there he moved to the El Paso Electric Co. as general superintendent.

He joined Gulf States Utilities in 1935 as vice president of the Lake Charles Division operations. He moved to Baton Rouge a year later.

He served as president and a director of the Southeastern Electric Exchange and as a member of the board of trustees of Southwest Atomic Energy Associates. Active in humanitarian, civic and cultural organizations, Mr. Leonard in 1952 received the Louisiana Engineering Society's award for outstanding civic work—the Andrew M. Lockett Award.

An electrical engineer, Mr. Brown is a graduate of the University of North Dakota. He began his utility career with the Tampa Electric Co. in 1925 and joined GSU in 1937 as superintendent of distribution in the Navasota Division.

In 1944 he was named operating superintendent of the Lake Charles Division and in 1953 moved to Beaumont as system operating superintendent. He became operations manager in 1955. A year later he was transferred to Baton Rouge.

Public Service E&G Meterman Wins Safety Council Medal

THOMAS A. DONOGHUE, a meterman in the Elizabeth area electric distribution department, Public Service Electric and Gas Co., has received the President's Medal of the National Safety Council.

While engaged in installing a meter in a new factory in Kenilworth, a man noticed that John Foster of Menlo Park had been overcome by exhaust fumes from a gasoline-driven pump and was lying unconscious in an eight-foot-deep manhole. With the aid of other men, Mr. Foster was lifted from the manhole.

Mr. Donoghue applied the back-pressure, arm-lift method of artificial respiration which he had been taught and had practiced regularly at Public Service. After several minutes, Mr. Foster was revived, and after being attended by a physician was taken home in a Kenilworth police car.

The President's Medal is the National Safety Council's only award for the saving of human life. The medal shows the figure of Safety staying the hands of the three Goddesses of Fate who would cut the thread of life.

THEODORE H. BUTLER, Executive Assistant of the Worcester County Electric Co., has been named Vice President of the utility, a subsidiary of the New England Electric System.

Mr. Butler was graduated from Massachusetts Institute of Technology in 1925 and joined NEES in 1928 as an assistant electrical engineer. Before joining Worcester County Electric, he served with various NEES subsidiaries, including the Northampton and Northern and Southern Berkshire utilities. During World War II, he served with the U. S. Navy Civil Engineering Corps.

ANDREW E. BURNETT, Operating Manager of Southern Electric Generating Co., has been elected Vice President of the company. Mr. Burnett joined SEG two years ago. Previously he had been manager of employee relations for Alabama Power Co., and had held various engineering and operating positions with that company. A 1930 graduate of Alabama Polytechnic Institute, he holds a master's degree from Massachusetts Institute of Technology.

Allen Named to EEI Duty in Nation's Capital

J. SCRIBNER ALLEN, recently with American & Foreign Power Corp., has joined EEI and will serve as sales representative in Washington, D. C., for the Institute's Sales Division.

J. SCRIBNER ALLEN

In his new post Mr. Allen will be available to provide information to government agencies in connection with the supply and application of electricity for various projects and developments.

Mr. Allen will not be concerned with legislative or political activities or information.

Mr. Allen served for three years at American & Foreign Power as consultant for sales and area development. Before that time he was for 10 years a sales engineer and product sales specialist in the Producer Goods Department of General Electric Co.

He received his electrical engineering degree from Norwich University. In World War II, he was a captain in the U. S. Army Signal Corps.

WILLIAM REID THOMPSON, a former superior court judge of North Carolina, has joined the legal staff of Carolina Power & Light Co. as Associate General Counsel.

Mr. Thompson was appointed to the superior court in 1958 and at 34 years of age was the youngest superior court judge in North Carolina. He is a graduate of the University of North Carolina and Harvard Law School. He served three years as a U. S. Navy officer during World War II, and was skipper of an LCI in combat. Admitted to the bar in 1949, he was a partner in the Pittsboro, N. C., law firm of Barber and Thompson for eight years and was elected to the North Carolina legislature in 1955 and 1957. He was active in the revision of state health laws.

Science Youth Day

(*Continued from page* 27)

centering around Edison, science, technology and science education.

Nearly 2,000 planning guides have been mailed to companies and organizations all over America.

In addition to Mr. Cisler, the United States Committee of the International Edison Birthday Celebration includes Walter C. Beckjord, Chairman, The Cincinnati Gas & Electric Co.; James B. Black, Chairman, Pacific Gas and Electric Co.; Detlev W. Bronk, President, the National Academy of Sciences; Philip Cortney, Chairman, U. S. Council, International Chamber of Commerce; William C. Ford, Vice President, Ford Motor Co.; Allen S. King, EEI President, and President, Northern States Power Co.; Sherman R. Knapp, EEI Vice President, and President, The Connecticut Light & Power Co.; Thomas W. Martin, Chairman, Alabama Power Co.; William C. Mullendore, Chairman, Southern California Edison Co.; R. G. Rincliffe, President, Philadelphia Electric Co., and Frank M. Tait, Chairman, The Dayton Power & Light Co.

Farm Sales

(*Continued from page* 24)

power supplier should be to find that best way. We should look at the over-all problem of generating and distributing electricity. We should make sure that all of us who are engaged in this business do so in the fashion that will result in the lowest over-all cost of making and distributing power. This means:

- No duplication of facilities between suppliers.
- Proper regulation.
- Joint planning of system growth and facilities.
- Sharing the benefits of coordination, with no one taking advantage of the other and neither taking advantage of an absent third party.

Both companies and cooperatives should help each other in these endeavors. A good way to start is through the exchange of information and ideas at meetings. We can expand our interchange of know-how. We have so much to learn and the future is so bright that we should not let it be darkened with unnecessary controversy.

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Percent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

August 1958-1959

SOURCE AND DISPOSAL OF ENERGY—MONTH OF AUGUST

	1959	1958	%
NET GENERATION* (Kwhr in Thousands)			
By Fuel Burning Plants	52,126,567	45,450,894	+14.7
By Water Power Plants	10,957,358	11,194,491	− 2.1
Total Generation	**63,083,925**	**56,645,385**	**+11.4**
Add—Net Imports over International Boundaries	220,688	161,281	+36.8
Less—Company Use	174,344	162,228	+ 7.5
Less—Energy Used by Producer	2,223,788	1,540,529	+44.4
Net Energy for Distribution	**60,906,481**	**55,103,909**	**+10.5**
Lost and Unaccounted for	7,248,220	6,106,531	+18.7
Sales to Ultimate Customers	**53,658,261**	**48,997,378**	**+ 9.5**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of August 31st			
Residential or Domestic	48,470,176	47,366,046	+ 2.3
Rural (Distinct Rural Rates)	1,673,155	1,660,481	+ 0.8
Commercial or Industrial:			
Small Light and Power	6,376,935	6,280,116	+ 1.5
Large Light and Power	324,517	314,389	+ 3.2
Other Customers	193,136	186,909	+ 3.3
Total Ultimate Customers	**57,037,919**	**55,807,941**	**+ 2.2**
KILOWATT-HOUR SALES—During Month of August (Kwhr in Thousands)			
Residential or Domestic	14,189,655	12,893,273	+10.1
Rural (Distinct Rural Rates)	1,498,573	1,312,968	+14.1
Commercial or Industrial:			
Small Light and Power	10,611,387	9,494,009	+11.8
Large Light and Power	25,296,559	23,445,273	+ 7.9
Street and Highway Lighting	446,355	419,096	+ 6.5
Other Public Authorities	1,192,569	1,078,430	+10.6
Railroads and Railways	363,472	292,869	+24.1**
Interdepartmental	59,691	61,460	− 2.9
Total to Ultimate Customers	**53,658,261**	**48,997,378**	**+ 9.5**
Revenue from Ultimate Customers (Thousands)	**$906,896**	**$836,854**	**+ 8.4**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended August 31, 1959			
Kilowatt-hours per Customer	3,490	3,314	+ 5.3
Average Annual Bill	$87.95	$83.84	+ 4.9
Revenue per Kilowatt-hour	2.52¢	2.53¢	− 0.4

* By courtesy of the Federal Power Commission.

** Due to increased kwhr sales to New York City Transit Authority.

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

September 1958-1959

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1959	1958	%
NET GENERATION* (Kwhr in Thousands)			
By Fuel Burning Plants	48,320,867	43,258,024	+11.7
By Water Power Plants	10,263,950	10,735,105	− 4.4
Total Generation	**58,584,817**	**53,993,129**	**+ 8.5**
Add—Net Imports over International Boundaries	211,775	227,036	− 6.7
Less—Company Use	167,143	158,482	+ 5.5
Less—Energy Used by Producer	1,596,175	1,466,918	+ 8.8
Net Energy for Distribution	**57,033,274**	**52,594,765**	**+ 8.4**
Lost and Unaccounted for	2,954,662	3,361,498	−12.1
Sales to Ultimate Customers	**54,078,612**	**49,233,267**	**+ 9.8**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30th			
Residential or Domestic	48,646,242	47,475,712	+ 2.5
Rural (Distinct Rural Rates)	1,670,509	1,665,466	+ 0.3
Commercial or Industrial:			
Small Light and Power	6,386,427	6,285,366	+ 1.6
Large Light and Power	326,974	316,539	+ 3.3
Other Customers	193,778	187,804	+ 3.2
Total Ultimate Customers	**57,223,930**	**55,930,887**	**+ 2.3**
KILOWATT-HOUR SALES—During Month of September (Kwhr in Thousands)			
Residential or Domestic	14,581,055	12,943,398	+12.7
Rural (Distinct Rural Rates)	1,343,221	1,169,810	+14.8
Commercial or Industrial:			
Small Light and Power	10,687,071	9,365,442	+14.1
Large Light and Power	25,353,893	23,877,507	+ 6.2
Street and Highway Lighting	478,071	448,601	+ 6.6
Other Public Authorities	1,210,837	1,083,380	+11.8
Railroads and Railways	364,333	289,060	+26.0**
Interdepartmental	60,131	56,069	+ 7.2
Total to Ultimate Customers	**54,078,612**	**49,233,267**	**+ 9.8**
Revenue from Ultimate Customers (Thousands)	**$921,510**	**$840,944**	**+ 9.6**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30, 1959			
Kilowatt-hours per Customer	3,517	3,331	+ 5.6
Average Annual Bill	$88.28	$84.27	+ 4.8
Revenue per Kilowatt-hour	2.51¢	2.53¢	− 0.8

* By courtesy of the Federal Power Commission.

** Due to increased kwhr sales to New York City Transit Authority.

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